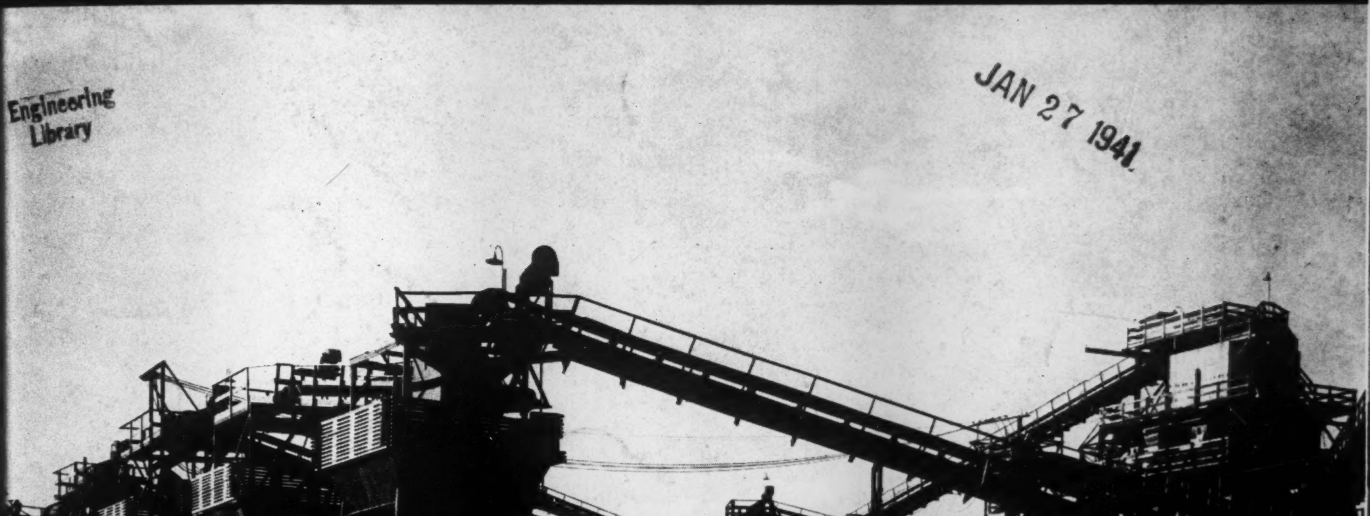
ENGINEERING NEWS-RECORD

Loading 300 tons of aggregate in less than a minute at Friant Dam—*See page 2*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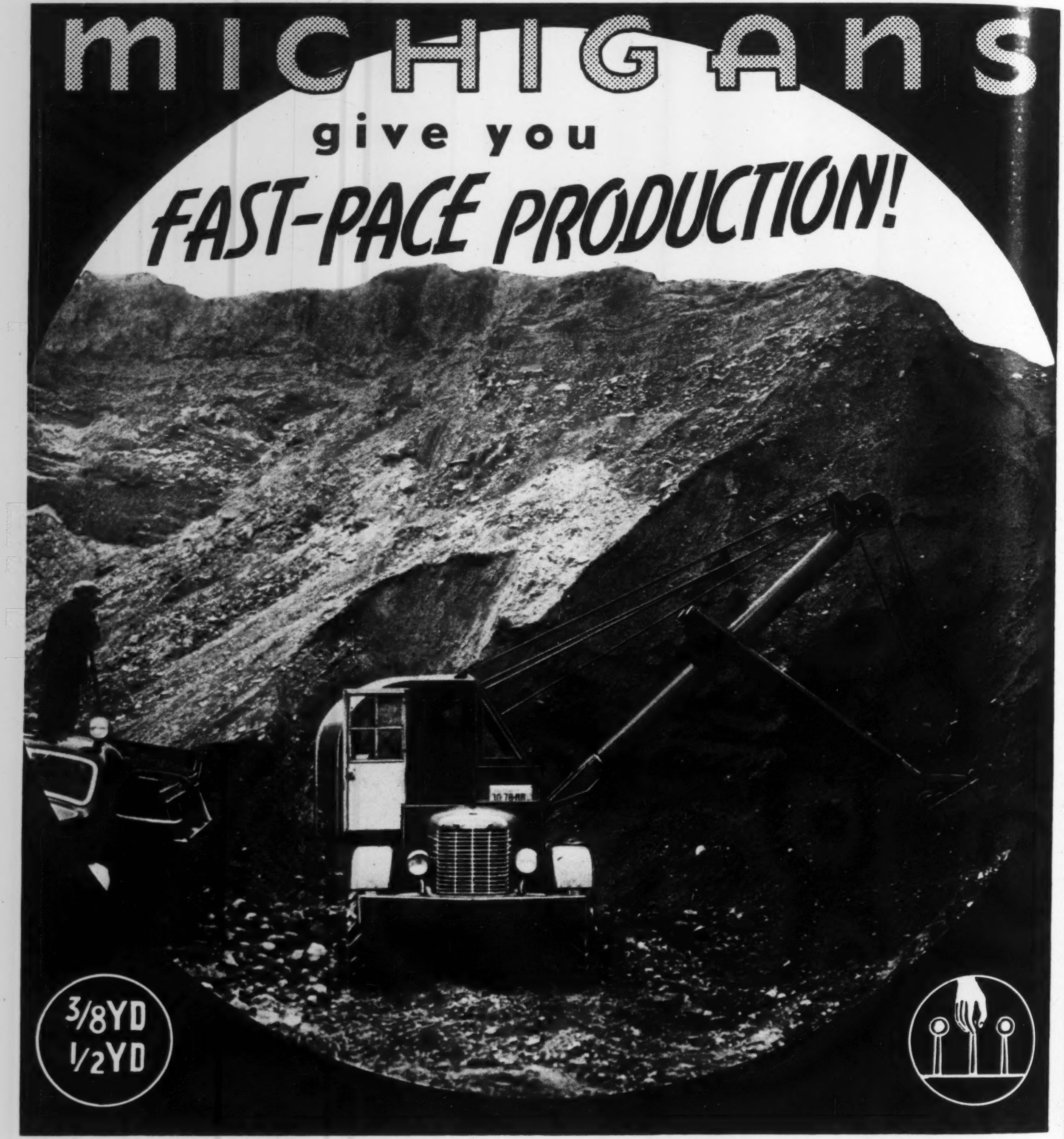

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The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • JANUARY 23, 1941

Civil Engineering learn plans to protect public services

One session of the annual meeting of the American Society of Civil Engineers devoted to civilian defense measures. John Fritz Medal goes to Ralph Budd

The close relation of civil engineers to problems of national defense was clearly evident at the 88th annual meeting of the American Society of Civil Engineers held in New York, Jan. 15-17. Major interest centered in the work of the society's recently formed committee on civilian protection in time of war (a committee that received official recognition from the War Department only a few days before the meeting convened) but the extent to which civil engineers are engaged in defense activities also was evident in reports of society activities, including the assignment of its officers to responsible defense work. Despite this interest in defense matters, several divisions held active and well-attended sessions. Pictures of the Tacoma Narrows Bridge collapse were shown at the closing session on Friday.

New high in membership

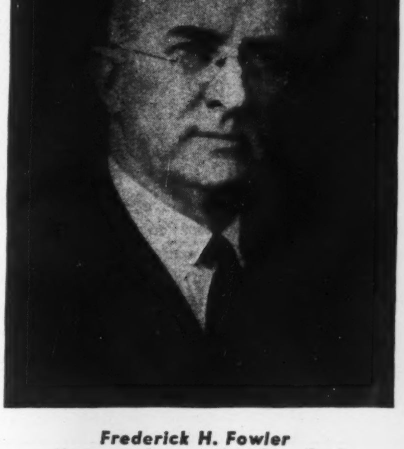
Membership in the society reached an all-time high in 1940, according to George T. Seabury, secretary, in presenting his report and that of the board of direction, the total now being 16,662. Junior members make up 26 percent of this total. Mr. Seabury reported further that the society had withdrawn from American Engineering Council during the year and that Field Secretary Walter E. Jessup now spends a large part of his time in Washington. During the year the society took an active part on the national defense program, President Hogan serving as chairman of the Construction Advisory Committee to the Army and Navy Munitions Board and Secretary Seabury serving as chairman of the National Committee on Construction Preparedness.

Honorary membership in the society was conferred on Prof. Charles P. Berkey of Columbia University, George H. Fenkell, Almont, Mich., J. D. Galloway, San Francisco, F. G. Jonah, St. Louis, and Reginald H. Thompson of Seattle. All but Mr. Thompson were present at the opening meeting to receive their awards.

Ralph Budd honored

A feature of the annual meeting was award of the John Fritz Medal to Ralph Budd, president of the Chicago, Burlington & Quincy R. R. and a member of the Advisory Commission to the Council of National Defense, in charge of transportation. The presentation was made by W. H. Harrison, chairman, John Fritz Medal Board.

Society medals and awards made at the annual meeting were as follows: The Norman Medal, to Shortridge Hardesty and Harold E. Wessman; the J. James R. Croes Medal, to Edward J. Rutter, Quintin B. Graves and Franklin F. Snyder; the Thomas Fitch Rowland Prize, to J. D. Galloway; the James Laurie Prize, to A. M. Rawn, A. Perry Banta and Richard Pomeroy; the Collingwood Prize for Juniors, to Capt. Kenneth D. Nichols; the Rudolph Hering Medal, to J. W. Ellms; the Construction Engineering Prize to Russell G. Cone; and the Daniel W. Mead Prize to Lieut. Allen Jones, Jr.



Frederick H. Fowler
New president of Am. Soc. C. E.

At the close of the annual business meeting the tellers reported the election of the following officers: President, Frederick H. Fowler, San Francisco; vice-presidents, Charles H. Stevens and Charles B. Burdick; directors, John W. Cowper, Gustav J. Requardt, William N. Carey, George B. Massey, Ralph B. Wiley, John W. Cunningham and Ernest E. Howard.

Civilian defense

Recognizing a need for the collection and dissemination of information concerning civilian protection in case of war, one session of the meeting was devoted to a roundtable discussion presided over by Walter D. Binger, chairman of the society's committee on this matter and recently appointed chairman of the War Department's National Technological Civil Protection Committee. Ernest P. Goodrich, vice-chairman of the society's committee, acted as moderator and called for reports from the chairman of the various subdivisions. In brief, these were as follows:

J. I. Parcel, consulting engineer, St. Louis, said that his group on structures was considering such matters as the design and construction of air raid shelters, investigation of existing structures, such as skyscrapers, to determine their present bomb resisting capacity, and means for strengthening them against impact and explosion, and the protection of bridges and tunnels. In regard to the latter it was revealed by Homer R. Seely, deputy commissioner of public works, New York City, that all openings in foundations and anchorages of the city's bridges have been closed and that increased police patrols are on duty to prevent sabotage. The air raid shelter study, said Mr. Parcel, involves economic as well as structural questions involving the capacity of such units as well as the

(*Continued on Page 10*)

New York Sewage Works Association hears of war experiences in Europe

Highlighting the technical program was the new information on sludge bank formation in streams revealed by Prof. Gordon Fair of Harvard University.

Public works planning and construction in the war-torn countries of Europe is being continued despite military operations and defense activities, according to Robert T. Campbell, assistant manager of The Dorr Company's associated company in Holland who recently returned here from his post. Mr. Campbell and S. R. Williams of the Paris office of the Worthington Pump Co. addressed a joint dinner meeting of the sanitary engineering division of the American Socity of Civil Engineers and the New York State Sewage Works Association, which followed the 13th annual meeting of the latter group on Jan. 17. Mr. Williams, who told of his experiences following the fall of France, stated that machine tools were shipped out of the country into Germany, but that the Worthington factory was permitted to continue operation.

Immediately following the occupation of Holland by the German army all cities were ordered to go ahead with their public works programs, said Mr. Campbell. An edict was proclaimed by the Germans forbidding price rises, the cancellation of orders for material and equipment, and discharge of employees. This was done in order to maintain activity and minimize unemployment.

As a result, many building projects are being continued. Amsterdam, for example, is completing a sludge elutriation and filtration plant, and Waterloo, Belgium is going ahead with its sewage treatment plant. In France and Germany public works are being fostered, and Italy is using its unemployed on a big road building program. In England, said Mr. Campbell, major emphasis is being placed on planning and specification writing for public works projects, which will be undertaken as soon as materials are available.

Sludge in streams

Sludge bank formation is Nature's way of temporarily relieving a stream of an excessive pollution load, explained Gordon M. Fair, professor of sanitary engineering, Harvard University. He pointed out that sewage solids which were precipitated as sludge, had a less immediate demand for oxygen and thus satisfaction of the full demands of pollution was delayed over a larger time period.

The rate of decomposition of organic matter in a sludge bank is variable in time, decreasing in such a manner, as a deposit ages, that it is halved about every three months. This retarding "or aging factor" can be expressed mathematically, said Professor Fair, and as a result of these studies he has been able to develop a new mathematical formulation of unimolecular decomposition.

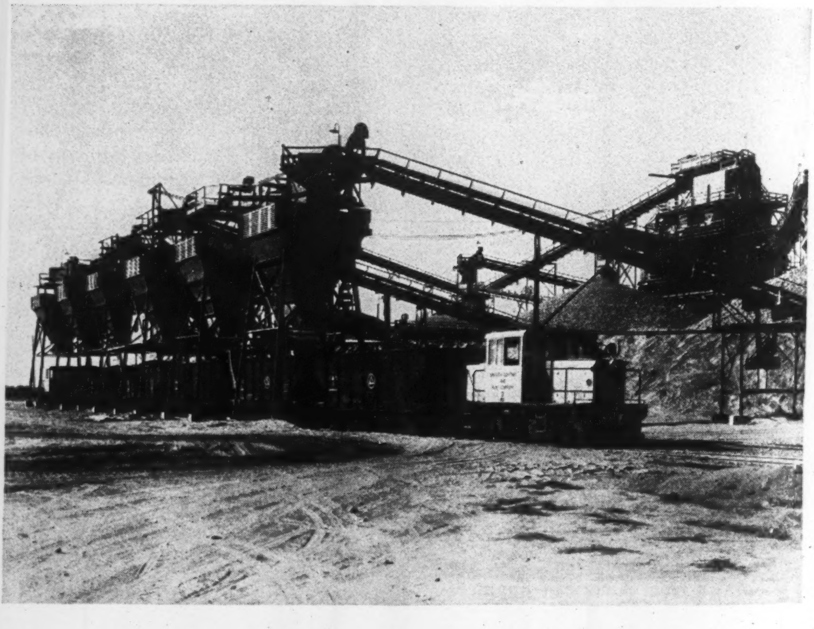
Studies of sludge bank decomposition can be classified in three periods, continued Professor Fair. They are: (1) youth, the period of excessive fermentation and rapid evolution of gases; (2) manhood, a period of gradual consolidation which controls the rate of transport of oxidizable material to the sludge-water interface; and (3) old age, a period of quiescent stabilization of organic material.

Sewage disposal in New York

Major emphasis on New York City's program of sewage treatment is now being placed in the Boroughs of Queens and Brooklyn where 54 per cent of the city's population is located, according to Richard H. Gould, acting deputy commissioner, Department of Public Works. Two plants have been completed, one is being enlarged, three are under construction or contract, and plans are being made for three others.

Other speakers on the technical program were: Earl Devendorf, assistant director of the division of sanitation, New York state department of health, who spoke on progress in sewage treatment; Charles R. Velzy, works superintendent, Buffalo Sewer Authority, who talked on public relations in the construction and administration of sewage works; and Rodney B. Cook, sanitary engineer, Suffolk county department of health, who described operating experiences at the Riverhead, L. I., activated sludge treatment works.

Herbert D. Wagenhals of Syracuse was elected president and Robert C. Wheeler of Albany became vice-president. Arthur C. Bedell, secretary-treasurer, reported that with its membership of 719 members, the New York State group is the largest sewage works association in the world.



Loading 300 tons of aggregate a minute

Six-car trains move into the aggregate processing plant on the Friant dam project, six hoppers let go at once, and in less than a minute 300 tons of stone and sand are loaded for the trip to the concrete mixing plant at the dam. Each hopper is filled by belt conveyor from the finished stock piles at the plant; four are used for gravel (3/4 in., 1 1/2 in., 3 in. and cobbles) and two are for sand. The rail haul from screening plant to dam site is about 3 miles.

Friant Dam, which is a unit of the Central Valley project in California, is being built by the Bureau of Reclamation. R. B. Williams is in charge of the Friant division of the project, and J. H. Warner is resident engineer. The contract is being carried out jointly by Griffith Co. and Bent Co.

Engineering News-Record is published every Thursday by McGraw-Hill Publishing Company, Inc., at 99-129 North Broadway, Albany, N. Y. Editorial and business offices 330 West 42nd St., New York, N. Y. Subscription, domestic, Canada, Mexico, Central and South American countries $5 for one year, $8 for two years, $10 for three years. Great Britain and British Possessions 54 shillings for one year, 108 shillings for three years. All other countries $9 for one year, $18 for three years. Entered as second class matter October 29, 1936, at the Post Office at Albany, N. Y., under the act of March 3, 1879. Printed in U. S. A. Cable address "McGrawhill New York." Member A.B.P. Member A.B.C. Copyright 1941 by McGraw-Hill Publishing Co., Inc. James H. McGraw, Founder and Honorary Chairman; James H. McGraw, Jr., President; Howard Ehrlich, Executive Vice-President; Mason Britton, Vice-Chairman; B. R. Putnam, Treasurer; D. C. McGraw, Secretary; J. E. Blackburn, Jr., Circulation Manager.

Iowa contractors look to future

Are warned they must start now to prepare for depressed economic situation expected later.

When the Central (Iowa) Branch of the Associated General Contractors of America held its 19th annual convention at Des Moines Jan. 8-9, it devoted its attention largely to consideration of the future of general contracting, although national defense construction was not overlooked.

H. B. Zachry, of Laredo, Texas, national president of the A.G.C., pointed out that the future of contracting will depend upon economic and political conditions, but warned that contractors must start now to prepare the industry for the depressed economic situation that is certain to follow the current era of huge federal expenditures. He urged contractors to work toward elimination of wasteful and obsolete practices and to cooperate with engineers, architects and public officials to revise hampering and archaic building codes and other legal restrictions, all of which boost the cost of construction. If high construction costs persist in the post-emergency period, he stated, there will be very little construction business. Zachry advised contractors to publicize their part in building for the country's defense to dispel the erroneous public impression of "fat fees and profiteering."

The nation has now reached the one third point in national defense construction, according to H. E. Foreman, managing director of the national association. He estimated that 2½ billion dollars out of the 12 billions already appropriated for defense will go into construction. Industry is on the spot, Foreman warned, and contractors must boost all industry, as well as the construction industry, to help fight the growing menace of socialization. He also gave a thorough analysis of recent federal legislation affecting contracting.

Trend of construction costs at the end of the present emergency period will largely determine the future construction market, according to Thos. S. Holden, vice president, F. W. Dodge Corp. He believes that the peak load of defense construction, as now planned, will occur during the first half of 1941, and construction activity during the second half will depend upon a demand for private work. Private work, in turn, depends upon reasonable costs. Mr. Holden sees an increase of 16 per cent in all construction for this year over the 1940 volume. (*ENR*, estimates 11%—see p. 1, Jan. 2, 1941.) Another speaker, Robert K. Goodwin, Redfield, Ia., outlined how the large defense construction contracts are negotiated.

New officers of A.G.C.'s Central Branch

When the Central Branch of the Associated General Contractors of America held its annual meeting recently at Des Moines, the men shown above were elected officers. They are: top row—Orville W. Crowley, executive secretary, Des Moines, Iowa; Paul B. Reis, vice-president, Des Moines; bottom—left to right—Amos Melberg, treasurer, Cedar Rapids; Robert W. Miller, president, Waterloo; V. L. Lundeen, vice-president, Montebume, Iowa.

Ole Singstad is president of consulting engineers

In accordance with usual custom, the American Institute of Consulting Engineers held its annual dinner meeting in New York City last week, when a large number of its members were in the East to attend the sessions of the American Society of Civil Engineers. Some 75 members and guests marked the completion of the 30th year of the Institute on the evening of Jan. 13 by listening to an address by Admiral Joseph M. Reeves, U.S.N., retired, on the subject of naval air forces. Rear-Admiral R. E. Bakenhus, C.E.C., U.S.N., retired, introduced Admiral Reeves, and Philip W. Henry, New York, president of the Institute, presided at the meeting.

Announcement was made of the election of three new members of the Council—Admiral Ruben E. Bakenhus, H. W. Buck and John P. Hubbell, and at a later meeting of the Council Ole Singstad was elected president for the coming year. James Forgie, New York, continues as treasurer and Mr. Henry as secretary. The new vice-president is Malcolm Pirnie.

Mr. Henry reported that gains and losses in members in 1940 balanced, so that the Institute roll remains at 126. Of these ten are charter members. He also reported that fee questions, legislative matters affecting consulting engineers, and the problem of keeping financial interests informed of the functions and services of the consulting engineer continue to engage the principal attention of the Council. An important committee study during the year was concerned with fees paid by governmental bodies for consulting services.

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Huge shipyard program being studied by Congress

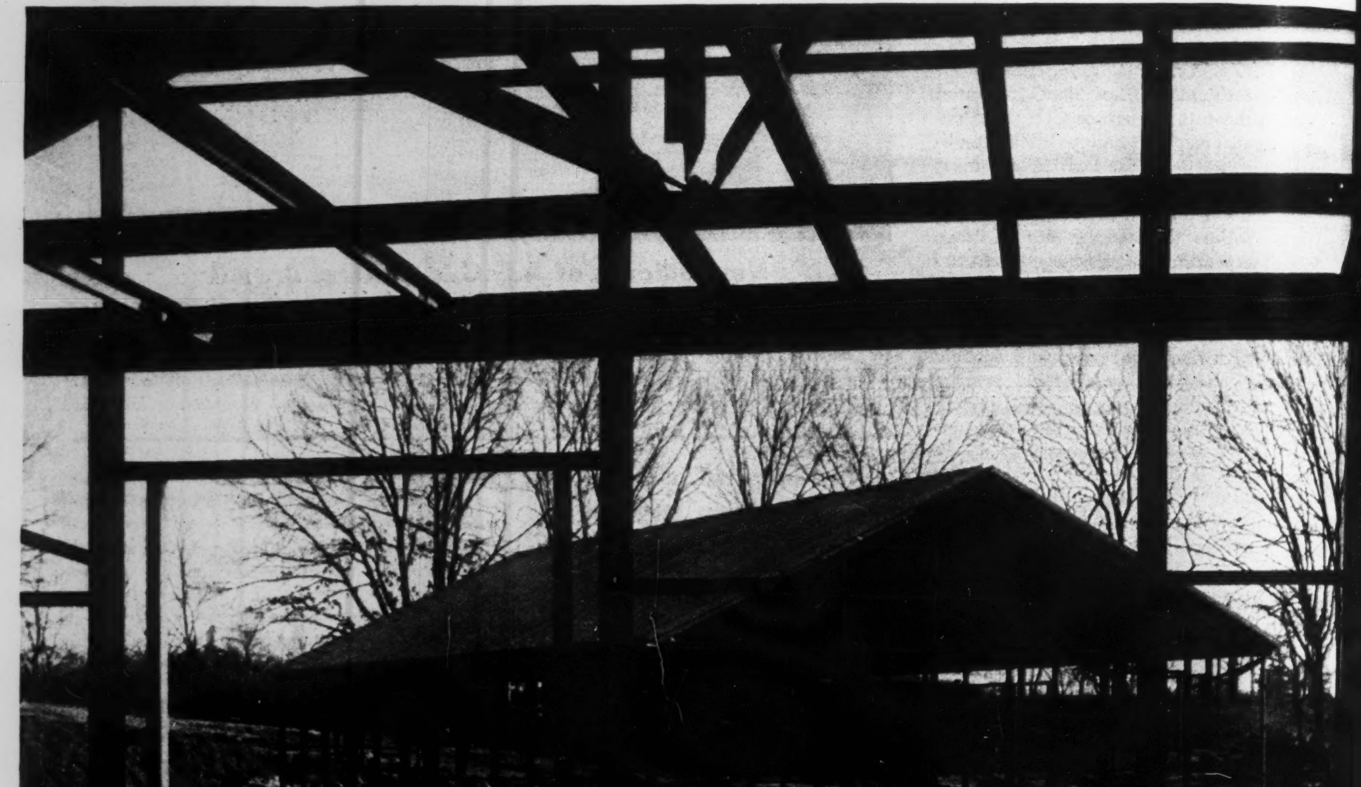
Legislative action has been started to provide half to three quarters of a billion dollars for construction of shipyards and ordnance plants in which to build and arm naval and commercial vessels. Farthest along is the plan for a new "Hog Island" program to build 200 simple 7,500-ton cargo ships. The President has allocated $36,500,000 in cash and contract authorization to start work on the shipways which will be needed for this program; three locations for the ways have already been decided upon—Los Angeles, Portland, Ore., and Houston. He has asked Congress to provide $313,500,000 more to cover the rest of the cost of the shipways plus the cost of the ships themselves. These new shipyards will differ from conventional yards in that they will be primarily assembly plants for parts fabricated elsewhere.

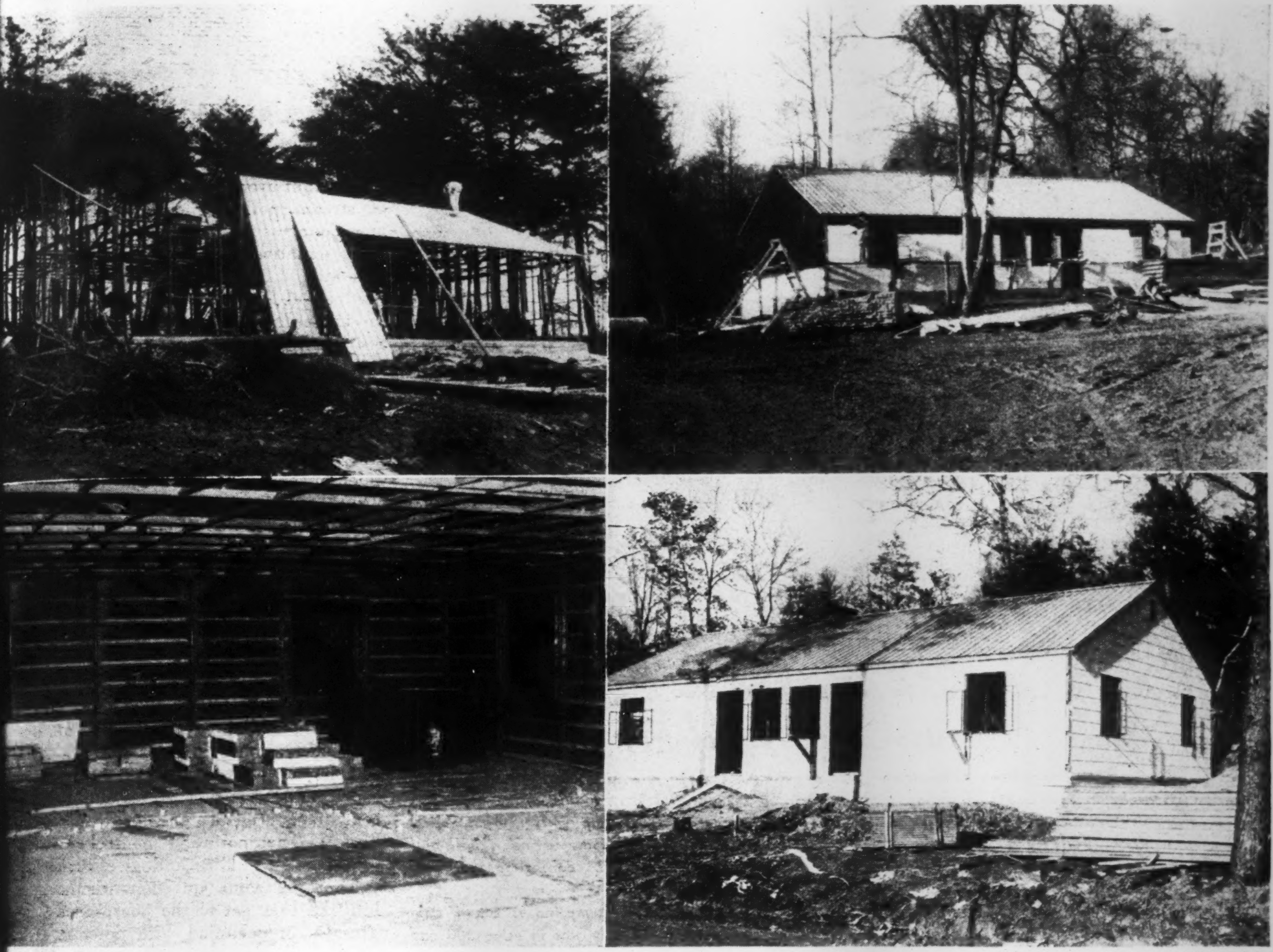
A bill authorizing a $315,000,000 program for construction and enlargement of shipyards in which to build naval vessels has been favorably reported by the House naval affairs committee. The same bill would authorize a program of expanding naval ordnance.

Prefabricated Housing for Marines at Quantico

INSIDE, looking out of a two-family dwelling, at Quantico, showing steel frame units, 4 ft. wide shop fabricated of welded cold formed steel channels and angles. Bolted in place, these panels, and others to form the roof, comprise the entire framework as shown in the house in the background.

Photo by Tennessee Coal, Iron & Railroad Co.





Photos by Tennessee Coal, Iron & Railroad Co.

GALVANIZED box rib sheet steel units (at top), are being spot welded to the roof framing. Upper right: Asbestos-cement shingles siding is being applied over insulated board sheathing (at left end of gable side) which is clipped to the steel frame. Lower left: Interior of typical room finished with ½ in. thick, 16 in. wide insulation board. Lower right: House nearing completion illustrates attractive appearance achieved by use of asbestos-cement shingle siding, steel casement windows and box rib steel roof.

FIRST PREFABRICATED HOUSES in the defense program are being erected by the Navy for 100 enlisted men of the Marine Corps and their families at Quantico, Va. The houses feature a demountable steel frame under a roof of sheet steel panels, and adapt themselves to the defense housing requirements of speed in construction, standardization of design, and high salvage value in the event it should become desirable to dismantle and reconstruct them elsewhere.

Resting on a foundation and floor slab of poured concrete, the steel panels need only be bolted into position. The steel frame superstructure can be completely erected from floor to finished roof by a 10-man crew in a single 8-hr. day.

The houses are 48 ft. wide across the front and 28 ft. from front to rear, and are divided into two apartments of equal size.

Prefabricated steel units for the superstructure—walls, ceiling and roof—are of standard width, 4 ft., and of a length to suit their location. The steel units are made of cold formed channels and angles with all connections spot welded. Door panels are provided with a steel casing ready to receive a wooden door, and window panels come equipped with steel casements. Interior partition panels are similar. All wall, ceiling and roof panels are bolted together at the site. The ceiling panels form the bottom chord of a roof truss when struts are placed between the ceiling and roof panels.

The roof panels are covered with 26 ga. sheet steel formed with two longitudinal corrugations; cover ribs are used at panel connection joints, while at the ridge is a covered continuous opening for ventilation of the attic. All steel frame units are delivered to the job with a galvanized protective coating.

Exterior siding is of fire resisting asbestos cement shingles applied over insulated board sheathing, clipped to the steel frame.

All interior walls and ceilings are finished with ½-in. fiberboard to serve as surface and insulation. These wallboard units are 16 in. wide, grooved on the edge to receive steel splines, permitting attachment to the steel cross members of the panels by clips. Floors are finished with ⅛-in. asphalt tile laid over concrete.

Houses similar to these but with steel sheet walls are being built at Newport News, Va., where 100 apartment buildings, each having four units, will provide living quarters for 1,200 families. The buildings, two-stories high will be 156 ft. long, and 32 ft. deep. Each project will contain six one-bedroom and six two-bedroom apartments.

Both of these housing developments are being built under a contract with the Bureau of Yards and Docks, Navy Department. The steel panel system being used in their construction is supplied by the Tennessee Coal, Iron & Railroad Co., U. S. Steel Corp. subsidiary, at Birmingham, Ala.

Frederick G. Hantz Photo

Daylight illumination for model drafting room

At the Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa., a model drafting room provides daylight illumination through the use of glass-block walls and fluorescent lighting. Space is provided for 40 draftsmen in a 37x40 ft. room. The three exterior walls are almost completely made of glass block, the total window area being over 1000 sq.ft. or about .703 sq.ft. of window area per sq.ft. of floor space. The room is illuminated with 51 fluorescent lamps, each of 80-watt capacity. They consume a total of 5,100 watts of electricity or approximately 3.45 watts per sq.ft. of floor space. The lighting is of the white type and illumination is practically uniform throughout the room, with 75-ft. candles at the table top working level. The lamp units are suspended from the ceiling on stems having a ball and socket connection at the ceiling so that they hang straight.

Total electrical consumption is about one-half of what it formerly was in using 300 and 500 watt incandescent lights, while the illumination is about three times as great. The lights are so arranged that in all cases there is one 48-in. light unit above each end of each drafting table, making the light practically shadowless.

Mud Mountain Dam fill to be placed under tent

Work on the fill for the $7,000,000 Mud Mountain dam in the White River canyon near Enumclaw, Wash., by U. S. Engineers will be started early next month. The Seattle Tent & Awning Co. of Seattle is completing work on a large covering which will be used to protect the dam's impervious core from rainfall and snow. This tent, heavily reinforced underneath by rope and cable and raised or lowered by great winches on the floor of the canyon, will be suspended over the center of the dam site.

Materials for the core will come from a borrow bit near the dam site and will be moved by rail to a drying plant at the canyon's edge from where they will be distributed by belt conveyors. The tent will be suspended at three elevations, 1000-, 1050 ft. and 1100 ft., channels having been prepared in the canyon walls on each side to receive and carry off the drainage so there will be no leakage through to the work below. The tent will measure 328x196 ft.

The White River has been diverted around the dam site by tunnel, and the Guy F. Atkinson Co. of San Francisco, contractors, has nearly finished the preparation of the site for the fill. The dam, 425 ft. high, will consist of a central impervious core covered with slopes of quarry rock.

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Traffic survey looks to turnpike extension

A traffic survey incident to extension of the Pennsylvania Turnpike from its present eastern terminus at Middlesex, near Harrisburg, to a point at or near Philadelphia, was started Feb. 22. The firm of Parson, Klapp, Brinckerhoff & Douglas, consulting engineers, of New York City, are making the survey. Thomas C. Frame, chief engineer of the Penn Turnpike Commission, states that $75,000 has been earmarked for this work.

Stream pollution legislation on the books again

The fight over federal action on control of stream pollution continues into the new Congress with the re-introduction by Representative Spence of the administration bill of last session. Last year's bill was passed by both houses but was hung up in conference. The Senate passed a bill setting up a division of pollution control in the Public Health Service, empowering it to make studies and give technical assistance to the states, and providing for loans and grants for pollution abatement works. In the House an amendment, introduced by Representative Mundt and pushed by the Izaak Walton League was inserted which would forbid new pollution of streams unless a federal license were obtained. This gave the House measure an entirely different effect from the Senate bill. Neither chamber would recede from its position and the bill finally died in conference with the end of the 76th Congress.

The new bill follows in almost all respects the administration bill of last session. It would authorize up to $50,000,000 a year of loans and 33⅓ per cent grants to public bodies and 100 per cent loans (on a ten-year 5 per cent basis). The pollution control division would make studies and give advice.

There is some question whether the bill will ever get to the floor, since Congress is preoccupied with defense. If it does, however, Rep. Mundt states that an effort will be made to introduce a compulsory feature—either by amendment or by bringing in an alternate bill.

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Cement Association forms soil-cement bureau

In recognition of the fact that soil-cement mixtures have become of major importance in the construction field, particularly in their use for light-traffic roads and streets, and at airports, the Portland Cement Association, Chicago, has created a Soil-Cement Bureau. The purpose of the bureau is to give added service to highway, airport and military engineers on all details of soil-cement testing, construction, specifications and use. Miles D. Catton, who has been in active charge of soil-cement development since the Portland Cement Association started research in this field seven years ago, has been named manager.

The first soil-cement project was started in South Carolina in 1935, and since that date 242 projects in 35 states have been built or are now under construction. The most recent example of this type of construction is found in Texas where the state highway department has built a 46-mile stretch of road through the famous King ranch.

Engineers to study civil defense problems

Committee appointed to cooperate with the War Department is headed by civil engineers

Secretary of War Stimson has appointed a committee of seven prominent engineers to study the problem of protecting municipal sewerage systems, water mains, subways, and buildings and of safeguarding civilian population against aerial invasion. The committee will cooperate with the War Department in formulating plans. Walter D. Binger, commissioner of borough works, Borough of Manhattan, New York City, and George T. Seabury, secretary of the American Society of Engineers, will be chairmen of the committee.

The national committee appointed by Mr. Stimson will include, in addition to Mr. Binger and Mr. Seabury, the following engineering society representatives: W. H. Carrier, of Syracuse, N. Y., American Society of Heating and Ventilating Engineers; Harry E. Jordan, of New York, American Water Works Association; A. B. Ray, of New York, American Institute of Chemical Engineers; Abel Wolman, of Baltimore, American Public Health Association; James L. Walsh, of New York, American Society of Mechanical Engineers; and Scott Turner, of New York, American Institute of Mining and Metallurgical Engineers. Maj. Eugene W. Ridings, of the War Department General Staff, will act as liaison officer between the department and the committee.

It is understood that the major portion of the committee's work will be carried out with the facilities and personnel of the American Society of Civil Engineers. Col. John P. Hogan, president of the American Society of Civil Engineers, this summer appointed a committee to study defense problems and establish a working arrangement with the War Department. A report of this committee is given in the account of the annual meeting of the Am. Soc. C. E., which appears on page one of this issue.

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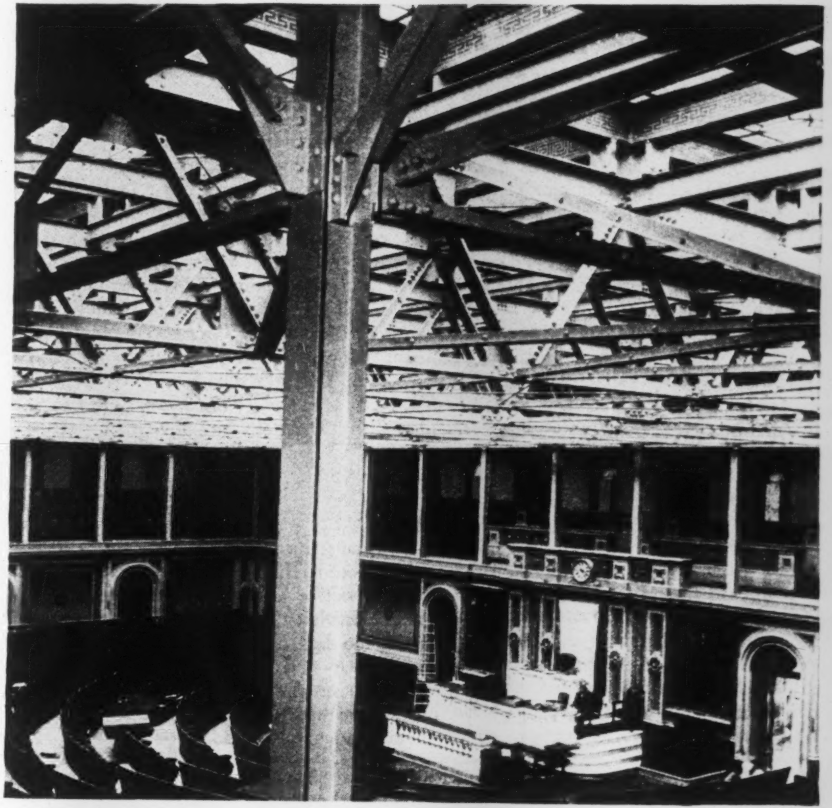


Wide World Photo

Temporary framing supports roof over Congress

When this temporary steel framing went up to support the roofs of the Senate and House chambers in the Captitol, Architect David Lynn slept easier than he had since the Thomas W. Marshall report of 1938 indicated the roofs were unsafe—a finding concurred in by three subsequent investigations ordered by Congress. An appropriation of $585,000 has now been provided to replace the roof, and the temporary framing has been installed to eliminate the danger meanwhile.

The existing roofs, built in 1858, are supported on the Senate side by twelve and on the House side by fourteen pinned trusses of 83 ft. and 96 ft. span respectively. Tension members are wrought iron and compression members cast iron. The trusses support a light copper and glass roof above them, and have hanging from them a cast iron and glass ceiling weighing 80 tons in the Senate and 120 tons in the House.

The trusses have not deteriorated seriously except for some slight bending of the pins and some cases in which one side of the double tension bars has loosened, throwing the load on a single bar. However, analysis shows that the roof, due to primitive design, has been unsafe since the day it was built. Bending stresses in the wrought iron pins, which apparently were designed only for shear, reach as high, theoretically, as 70,000 lb. per sq.in. The l/r ratio of the compression members is as much as 175 and they are spliced at the center, resulting in overstresses of at least 100 per cent. Deflections of as much as 1 in. laterally in the compression members have been observed. The sway bracing is entirely inadequate.

Rehabilitation procedure has been to build a framework of bolted angle and channel trusses resting on H-beam columns. By jacking and blocking, the weight of the cast iron ceiling was transferred to this framework (whereupon the old trusses rose 1½ in.). Here the work has stopped until Congress decides to take a long adjournment. At that time a temporary wooden roof will be erected over the present roof, supported by the temporary framing, to keep out the weather. Then the old trusses and the copper roof will be removed, a new insulated roof and riveted steel trusses will be installed, the cast iron ceiling suspended from the new trusses, and the falsework removed.

Building Program for Illinois Tech

Inauguration of a $3,000,000 building development program by the Illinois Institute of Technology, Chicago, have been announced by Dr. Henry T. Heald, president of that institution. Illinois Institute of Technology came into being last July when Lewis Institute of Arts and Sciences was merged with Armour Institute, and today there are 7,000 students enrolled.

The necessity for undertaking an expansion program, according to Wilfred Sykes, of the Inland Steel Co., chairman of the Institute's board committee on policy, is due to the fact that over 20,000 engineers are employed in the Chicago industrial area, and that the number of engineers in Chicago in comparison to the total number of industrial workers exceeds that of any other city.

Dr. Heald, in making the announcement, stated that plans for future expansion envisioned a single campus.

MEN AND JOBS

George F. Nicholson, Los Angeles consulting engineer specializing in harbor work and holding a commission in the U. S. Naval Reserves as commander, was called into active service with the Navy Jan. 2.

A. L. McFarland has been appointed engineer for Ross County, Ohio, assuming his new duties on Jan. 6. Mr. McFarland has appointed the following on his staff: **John W. Reppel**, assistant division maintenance engineer for the Ohio State Highway Department, becomes chief deputy; **George Targee** has been made superintendent and **Walter Hughes** road inspector.

Sidney C. Bucher, formerly connected with the Wayne County, Ohio highway department at Wooster, has been appointed by **Walter Metzler**, county engineer, as maintenance engineer and superintendent. Mr. Bucher has been located at Attica, Ohio, where he has been working on a drainage project for a CCC camp.

L. W. Althop, district engineer for the Oregon division of the Union Pacific, has been promoted to district engineer of the Eastern division with headquarters at Omaha, Neb. **George J. Adamson**, district engineer of the Eastern division of the Union Pacific, has been promoted to the staff of the chief engineer as acting assistant chief engineer with headquarters at Omaha.

W. F. Hart, general roadmaster of the Nebraska division, Union Pacific, has been appointed division engineer with headquarters at Omaha. Mr. Hart, a graduate of the University of Nebraska, has been employed in the engineering and maintenance department in the Nebraska, Colorado, Wyoming and Utah divisions since 1916 for the Union Pacific.

M. L. Evans, architectural engineer, has been named acting city engineer for Hastings, Neb., succeeding **H. D. McGaw**, who has been called to active service in the U. S. Army.

M. W. McCallum, has been appointed chief engineer of the Monongahela Ry. and the Pittsburgh, Chartiers & Youghiogheny Ry., branches of the Pennsylvania R. R. Mr. McCallum was former division engineer for New York Central.

Joseph E. Borg has resigned as instructor in structural engineering at Fenn College, Cleveland, Ohio to accept an appointment in the Quartermaster General's Office in Washington, D. C. Mr. Borg holds a second lieutenant commission in the Army Reserve Officers Corps. **Edmund J. Phillips**, Cleveland, has been appointed assistant professor in structural engineering to fill the vacancy caused by the resignation of Mr. Borg. Mr. Phillips graduated from Iowa State College in civil engineering in the class of 1908. He has served as chief designer with the Cuyahoga County engineers office, Cleveland; the Michigan Central R. R. at Detroit; the New York Central R. R. at Cleveland; the Muskingum Conservancy District and for many years with the Republic Structural Iron Works in Cleveland. **Oscar Hoffman**, formerly professor of engineering materials at Milan University, is now instructor in engineering materials at Fenn College. He succeeds **D. C. Fabel**, who has reported for active duty as major in the Ordnance Division, Washington, D. C. Mr. Hoffman has been teaching concrete engineering and foundation structures in the structural department since resigning from the engineering department of the Hausman Co., Toledo, in October.

Thos H. Allen has been made president of the Memphis Light, Gas & Water Division at Memphis, Tenn. Mr. Allen, who succeeds the late Wilson W. Mallory, has been engaged in the field of waterworks engineering for the past 25 years.

Julian E. Tobey, of Hamilton County, Ohio, has been appointed a member of the Ohio State Board of Registration for Engineers and Surveyors, to serve until Sept. 25, 1945. He succeeds **Ivan R. Ault**.

Philo H. Schultz, assistant bridge engineer for the South Dakota State Highway Commission, has been appointed state bridge engineer during the absence of **K. R. Scurr**, who has been called for active military duty.

H. S. S. Sternberg has been appointed plans engineer of the South Dakota State Highway Department. Mr. Sternberg succeeds **P. D. Hickman**, who was promoted to the office of pre-construction engineer. He has been an engineer with the Public Works Administration for the past six years and was located at Omaha, Neb.

Meredith Collier, who has been assistant superintendent of the Atlanta, Ga. waterworks department, has been made superintendent. He succeeds W. M. Rapp, who died recently.

E. R. Duckett, construction engineer of Fort Worth, Tex., formerly with Consolidated Engineering Corp., has assumed new duties at St. Croix, West Indies, as construction engineer on a U. S. Government defense project.

Lt. Col. Daniel Noce, district engineer for the U. S. Engineers at Memphis, Tenn., has been ordered to training duty at Rolla, Mo. **Lt. Col. James D. Andrews**, now chief of operations of engineers depot, at West Memphis, replaces Lt. Col. Noce. Colonel Noce was an engineer on the Passamaquoddy work, Maine, and during the World War he commanded the 602d Engineers. He is a graduate of West Point and of M.I.T.

Daniel H. Stouffer was recently elected county engineer at Paulding, Ohio.

T. C. Freshour, Troy, Ohio, who was recently appointed Ohio County engineer, has named the following to his staff: **W. R. Kinder**, who was formerly connected with the Ohio State Highway Department, becomes chief deputy, and **M. A. Gantz** will continue as engineer together with **Linden Essex** and **Howard M. Pearson** as assistant engineers.

Arthur D. McGinnis is now instructor of civil engineering at Queen's University, Kingston, Ont. Mr. McGinnis will have charge of lectures and laboratory courses in highway engineering.

Thomas N. Creacy, formerly with Consolidated Builders, Inc., Mason City, Wash., has accepted a position with Puget Construction Co. He is now working on the Bonneville powerhouse project.

Edwin W. Baldwin, who has been employed in the flood-control section with the U. S. Engineers at Louisville, Ky. since March 1937, has been called to active duty in the army. Mr. Baldwin holds a first lieutenant commission and has been assigned to construction work at Bowman Field Airport, Louisville.

Leon Luke, of Mt. Clemens, Mich., has been appointed special assignment engineer in the maintenance division of the Michigan State Highway Department. Mr. Luke had been with the Macomb, Mich. County Road Commission for 21 years before his resignation. He had served as assistant engineer and as engineer. At the time of his new appointment he was president of the Michigan Association of Road Commissioners and Engineers. On his new job he will be working with the road commissions of 33 Michigan counties that maintain state trunk-line roads under contract with the state highway department.

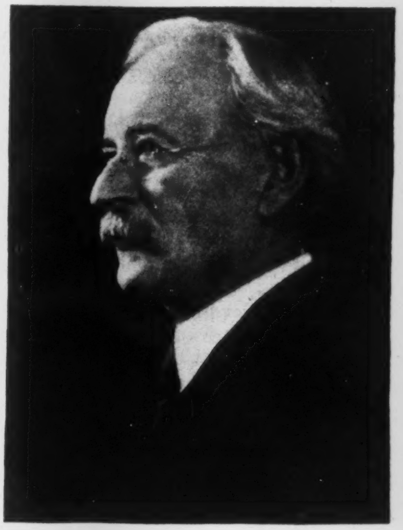
Louis M. Nims has resigned as deputy commissioner of the Michigan State Highway Department to accept appointment as managing director of the Michigan State Board of Tax Administration. Mr. Nims formerly was state WPA administrator for Michigan.

New Am. Soc. C. E. Honorary Members

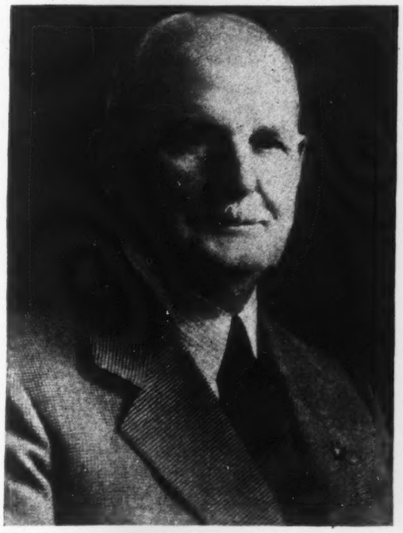
At the 88th annual meeting of the American Society of Civil Engineers in New York Jan. 15-17 the five outstanding men shown on this page were made honorary members.

George Harrison Fenkell *might well be called the father of Detroit's water supply system having entered the service of the water department of that city in 1896 as a draftsman. Mr. Fenkell was civil engineer to the board of water commissioners from 1908 to 1913; commissioner of public works from 1913 to 1918; and general manager of the department of water supply until his retirement in Aug. of 1938. With the exception of a five-year period with the city of Erie, Pa., as civil engineer, he has been serving the city of Detroit continuously for the past 42 years.*

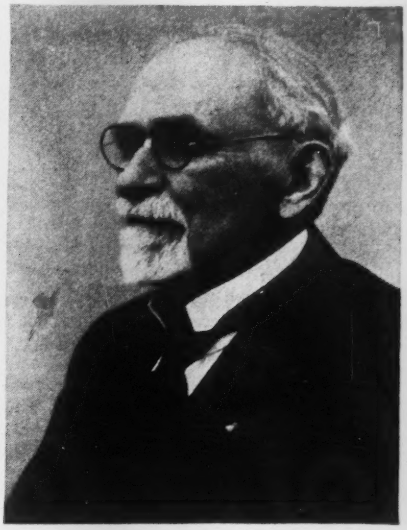
John Debo Galloway's *name is indelibly stamped upon the development of the Pacific Northwest. Starting as a civil engineer on railway work at San Francisco in 1882, he later became an outstanding structural engineer. He was one of the pioneers in design and construction of earthquake resisting structures. Mr. Galloway is best known, however, for his work in the field of hydro-electric power developments. Much of his most important work was with the Pacific Gas & Electric Co. He has been consulting engineer on many important projects in the Northwest.*



Charles Peter Berkey *is a scholar, an author, and one of America's foremost geologists. He holds three degrees, including doctor of philosophy, from the University of Minnesota and a doctor of science degree from Columbia University. From 1893 to 1903, he was instructor of mineralogy at the former school. In 1903 he joined the faculty of Columbia University as instructor. In 1929 Columbia made him Newberry professor of geology, a position he now holds. He has served as consultant on many important civil and mining engineering projects.*



Frank G. Jonah, *chief engineer of the Frisco Railway system, has been identified with nearly every important railway development in the middle west since 1890. He began his career as resident engineer in charge of construction on government railways in Nova Scotia in 1887. Mr. Jonah was assistant engineer for the St. Louis Merchants Bridge Terminal Railway for 8 yrs. In 1910 he became chief engineer of construction for the Frisco, and was promoted to chief engineer of that system in 1913.*



Reginald Heber Thomson *became city engineer of Seattle, Wash., in 1892. He supervised the design and construction of Seattle's gravity water system, and promoted the establishment of the port of Seattle. During his 19 yrs. service as city engineer practically all of Seattle's large re-grade projects were planned and executed. In 1911 he was made chief engineer for the Seattle Port Commission. Since 1938 he has been a member of the board of consulting engineers for the Washington Toll Bridge Authority.*

Civil Engineers' meeting

(Continued from page 1)

type of material to be used for their construction.

Prof. Charles B. Breed of Massachusetts Institute of Technology, discussed transportation problems. He urged that highway departments make advance plans for emergency repairs in war time using their present organizational methods employed in snow removal and similar operations.

Philip Sporn, vice-president and chief engineer of the American Gas & Electric Service Corp., reported that the Federal Power Commission is working with utility engineers and other agencies on plans to prevent the stoppage of service. One of the possibilities being studied is the construction of emergency distribution and generating plants to be mounted on automotive and railway equipment. Allen J. Saville, consulting engineer of Richmond, Va., reported that his subdivision on emergency control, sabotage and camouflage, is concerned with transportation studies involving the evacuation of civilians from bombed cities to prevent the blocking of strategic roads, and is studying the possibilities of smoke and smudge fires for the blackout of dams and other structures.

Samuel A. Greeley, Chicago consulting engineer, said that his committee on sanitation and public health proposes to establish yardsticks by which it will be possible to appraise the condition of sanitary service facilities in each community. Following such an appraisal steps can be taken to eliminate weaknesses and bring the system up to maximum efficiency. Among other things, great stress would be laid on the necessity for bringing all maps and records up to date.

Lively discussion ensued over the question of contaminating water supplies with pathogenic bacteria and poison. It was reported that German and Russian army experiments showed this to be ineffective—cultures of bacteria inoculated in the water did not survive and poisons were easily detected.

Problems in applied mechanics

With a program entirely devoted to advanced problems of applied mechanics, the structural division chalked up such an attendance that the meeting had to be adjourned to a room twice as large as originally provided. The program was made up of four papers: "Three-Dimensional Photoelasticity", by R. D. Mindlin, Columbia University; "Prediction of Earthquake Stresses", by M. A. Biot, Columbia University; "Structural Behavior of I-Sections", by L. C. Maugh, University of Michigan; and "Bending Moments in Walls of Rectangular Tanks", by Dana Young, University of Connecticut. Although such papers defy successful abstracting, they did develop some significant conclusions that can be presented here.

Three-dimensional photoelasticity, as contrasted to the usual use of the photoelastic method to study only two-dimensional stress distributions, is making good progress, according to Prof. Mindlin. Two methods have been developed—the "freezing" method and the "scattering" method. In the freezing method the transparent model of hardened resinous material is heated, loaded and then cooled under load. The result is that deformations are "frozen" in the model. Slices of the model retain these deformations which can be evaluated by photoelastic apparatus and procedures. In the scattering method, the transparent model is analyzed under actual load, using the fact that the light scattered from any point is transmitted along two mutually perpendicular axes (the axes of secondary principal stress) lying in the plane perpendicular to the wave normal. Fringe patterns are formed from which maximum principal stress differences can be obtained as in two-dimensional work. Improvement of the freezing method depends upon development of a photoelastic material whose modulus of elasticity does not drop excessively at the annealing temperature, while advance of the scattering method requires design of standard apparatus and development of a model material free of initial double refraction. In discussion Prof. E. K. Timby (Princeton University) urged engineers in private practice and in industry to lend a hand in this new field of study, now too much dominated by college scientists.

Received John Fritz Medal

The John Fritz Medal, highest award of the engineering profession, was presented to Ralph Budd, head of the transportation section of the Council of National Defense, at the annual meeting of the American Society of Civil Engineers. This award is made annually by the four major engineering societies for notable achievement in any field of engineering.

Predicting earthquake stresses from the strong motion accelerograph records of actual earthquakes is aided by translating the records into so-called spectrum curves whose ordinates give the accelerations producing the same maximum shears as the earthquakes; the abscissas are periods of vibration. Multiplying the ordinate value for a period corresponding to that of the building by the mass of the building gives the shear. Prof. Biot discussed these spectrum curves and described a mechanical analyzer developed on the torsion-pendulum principle, which can be tuned for various periods of vibration and by which accelerograph records can be quickly translated into spectrum curves.

By using small scale models of celluloid, brass or steel, Prof. Maugh has been studying several of the more difficult design problems associated with the use of I-sections in continuous frames: (a) deformation in I-sections with curved flanges; (b) lateral flexure of I-sections subjected to buckling, and (c) effective cross section for I's with variable depth. In general, for both (a) and (b), more liberal use of web stiffeners is indicated. For (c), use of an equivalent flange area $A \cos^2 \alpha$, where A is area of flange and α the angle of inclination of the flange with the axis of the member, permits calculation of normal stresses by the usual flexure formula. Prof. Young's paper developed a solution for one of the most difficult of structural problems—deflection and bending moments in the vertical side walls of rectangular water tanks open at the top—by setting up a series of simultaneous deflection equations each based upon a different loading and set of boundary conditions. Resulting coefficients are then used to determine bending moments by the plate theory.

Concrete design

An entire session of the structural division was devoted to a series of brief presentations of the highlights of the various sections of the 1940 report of the joint committee on concrete and reinforced concrete. F. E. Richart presided, and committee members taking part were F. R. McMillan, F. H. Jackson, S. C. Hollister, A. J. Boase, M. Hirschthal and P. W. Norton. Discussion from the floor developed praise for the report as a whole and one or two points of detailed criticism. C. A. Ellis (Purdue University) expressed dissatisfaction with the new spiral column formula on the ground that use of gross area permits an unsafe increase in allowable load. H. E. Burr (Erie RR) asked the committee for a concrete specification that will improve quality and economy on the small job, where continuous checking of moisture content is not practicable; he suggested that a minimum cement factor be specified. T. K. A. Hendrick and N. T. F. Stadtfeld (New York Board of Water Supply) urged that specifications include the complete manufacturing history of the cement. H. E. Wessman (New York University) praised the new specification for being definite enough to be instructive and at the same time allowing the designer a large measure of latitude in applying it.

TVA cost allocations

A paper by T. B. Parker, chief engineer of the Tennessee Valley Authority, which described the method of cost allocation used by the authority, and the discussion following the presentation of the paper, occupied the entire session of the waterways division. Mr. Parker referred to his paper as an explanation of the allocation method used by the TVA and not an effort to justify the method or procedure. After indicating the various allocation principles which were studied and discarded as unsuited for the TVA problem of allotting cost to services, he outlined a simplified example of the method used to distribute costs among the elements of navigation, flood control and power development. The TVA method includes: (1) the charging of direct costs and (2) the adding of proportionate amounts of the common costs, allocated on the estimated cost of single-purpose projects which would be required to provide the facilities to be furnished by the multi-purpose project. Discussion by William P. Creager related specifically to the procedure by which the TVA allocates the power cost in the multi-purpose project. Mr. Creager expressed the view that the full cost of the corresponding single-purpose power development should be included rather than its proportionate share of the total of the three single-purpose projects.

A scheduled paper by Major R. E. Coughlin, Corps of Engineers, on "Allocation of Costs in Multi-purpose Projects" was not presented because the information on allocation methods being developed and used by the U. S. Engineer Department is not ready for discussion.

Grease removal from sewage

Some interesting findings as well as theories concerning grease removal from sewage were revealed in the symposium on this subject conducted by the sanitary engineering division. Lead-off man, Almon L. Fales, consulting engineer of Boston, told how he and S. A. Greeley, consulting engineer of Chicago, made a study of the grease problem in connection with Boston's proposed sewage disposal project.

The quantity of grease in sewage was said to vary from 25 to 100 ppm., and when industrial wastes are present it may reach 500 ppm. Grease may detrimentally affect treatment processes, and if it reaches the receiving body of water forms a sleek which hinders self purification, kills fish and forms unsightly deposits on beaches. Removal is accomplished by means of skimming tanks. Tests at Boston showing that 40 percent might be taken out in this fashion. To assist floation of grease, sewage is frequently aerated, sometimes with the addition of chlorine gas. Aeration is helpful in securing greater removal, concluded Mr. Fales, but further data is needed to determine the effectiveness in all cases of adding chlorine with air. Data from one plant (Lancaster, Pa.) showed that skimming alone took out 38 percent of grease, aeration removed 50 percent, and aerochlorination took out 80 percent.

S. A. Greeley pointed out that further knowledge is needed on the distribution of grease. "What part of the total grease content is represented in skimmings, in the settled sludge and in the effluent of a treatment plant?" he asked. If there is only a small percentage of grease in sludge, there will be little advantage in increasing costly sedimentation facilities to secure additional grease removal.

Concurring with Mr. Fales that further data is needed to determine the effectiveness of grease removal using aeration or aerochlorination, A. M. Rawn, chief engineer of the Los Angeles County Sanitation District, emphasized the inadequacy of grease analysis. Many inconsistencies in data may be traced to the method and kind of solvents used in making grease determinations in the laboratory. He also pointed out that grease floated to the surface as the result of agitation may be more difficult to remove than would be the case if it were permitted to settle.

Arthur D. Weston, chief engineer of the Massachusetts State Health Department, reported tests on Boston's sewage

Low cost record established on USHA project at Phoenix

A record for low-cost construction has been established on the first of a three-unit, $1,700,000, low-rent housing project now nearing completion at Phoenix, Ariz., which is being erected by the local housing authority in co-operation with the USHA. The cost is $1,684 per dwelling unit, the lowest yet achieved among the 100,000 homes for low-income families erected under the USHA.

Containing 150 apartments, the first unit consists of one-story two-family and row houses, built with concrete foundations, brick walls, concrete floors and wood ceilings. The roofs are of vari-colored clay tile. The interior walls are brick, 4 in. thick, with special brick to allow conduit, pipe and other fixtures to be placed in the walls. All ceilings are insulated and special ventilators are placed under the eaves and at the apex of the roof. An air cooling mechanical system of the evaporation type is installed in each apartment.

The plans provide for a living room, kitchen-dinette, bath, utility and storage rooms and from one to three bedrooms in each housing unit. Equipment consists of gas-fired heaters, stoves and hot water heaters and automatic refrigerators.

Assembly line technique was used in the construction, that is, workmen moved from one house to another; one group of carpenters fabricating roof trusses, another group erecting the trusses followed by a third group who nailed on the sheeting. This method was largely responsible for the low cost record established on this project.

Lesther & Mahoney are consulting and supervising architects. One unit of 224 apartments is being constructed by the Del E. Webb Construction Co., a second unit of 150 apartments by Womack Construction Co. and a third unit of 150 apartments by Duhame Construction Co. Ira S. Reed is construction adviser for the USHA.

showing that it contained from 34 to 84 ppm. of grease. With a daily discharge of 244 mg., this sewage produced sleek fields in the harbor waters covering as much as 3,000 acres.

Mr. Weston was elected chairman of the sanitary division for the coming year.

Depreciation discussed

Efforts of the power division to expand its usefulness, inaugurated following a symposium on future work of the division held last January, bore fruit in the form of one of the largest meetings of the division held in recent years. Under discussion were the fundamental aspects of the depreciation problem, a program arranged by a joint committee on depreciation made up of representatives of the power, city planning, construction, engineering economics, highway, sanitary and surveying and mapping divisions.

Gabriel A. D. Preinreich, certified public accountant, New York, opened the discussions with a paper on the theory and general principles of depreciation. He sees no purpose in introducing depreciation accounting into government finances. That view was opposed later by other speakers who held that it should be included in all government operations that are or should be on a self-liquidating basis.

J. A. Walls, president of the Pennsylvania Water and Power Co., took up the subject of depreciation from the angle of the regulated utilities. He noted that there are numerous concepts of depreciation, hence it is important that the concept that is applied must be in line with the objective sought. He does not think determination of depreciation can be reduced to a mathematical formula.

Prof. Eugene L. Grant, Stanford University, also noted the various concepts and the confusion that results therefrom. He expressed the hope that the joint committee on depreciation will be able to eliminate some of the confusion that now exists.

H. J. Flagg, chief engineer, New Jersey Board of Public Utility Commissioners, supported the opinion expressed by Mr. Walls that depreciation cannot be reduced to a mathematical formula. Great uncertainty, he said, surrounds any attempt to predict the future life of utility equipment. C. B. Benson, New York Public Service Commission, acknowledged the uncertainties that surround attempts to develop mathematical methods but noted that an analysis of life tables of $400,000,000 of utility property compiled by the New York commission, indicates that obsolescence of equipment is very closely related to age, thus making it possible to predict quite closely the remaining useful life of equipment.

Nelson Lee Smith, chairman of the New Hampshire Public Service Commission, expressed similar views, stating that statistical studies of past experience are very helpful in predicting future useful life. Judgment, he said, must be applied to the statistical information, but judgment alone should not be substituted for a statistical approach.

Roy W. Crum, director of the Highway Research Board, and Prof. Robley Winfrey of Iowa State College discussed depreciation as applied to public works, chiefly to highways. They pointed to the need for adequate depreciation accounting in highway finance as an aid to sound advance plannning. Many governmental agencies, however, are kept from setting up proper depreciation accounting by antiquated laws requiring cash accounting.

Prof. Paul T. Norton, Jr., Virginia Polytechnic Institute, pointed to the danger inherent in attempting to apply capital accounting to non-liquidating public works. Such methods can be used to fool the public into unjustifiable expenditures on the false assumption that the expenditure can spread over a long period of years by the application of such accounting.

George E. Goldthwaite expressed the opinion that the present unwillingness of utility companies to face depreciation properly is understandable in view of the past history of utility regulation, but he believes that their failure now is working to their disadvantage. Anything that postpones amortization, he said, invites financial suicide.

St. Lawrence power opposed

Following the papers on depreciation, a resolution offered by Lynne J. Bevan opposing start of work on the development of the International Rapids section of the St. Lawrence River for power and navigation as a defense measure was considered. After some discussion as to the propriety of taking up such a controversial subject in a division meeting without advance notice, the resolution was adopted by a vote of 17 to 11, many of those present not voting.

Airport construction

The one session of the highway division was given over largely to two papers on airport construction, one by E. L. Tarwater, highway engineer of the Public Roads Administration, on the runways of the new National Airport in Washington, and the other by George H. Bunker of the Interstate Amiesite Co. on the type of bituminous runways built by his company. This pavement is of the open type with a sealed top. In discussion it was noted that this type contrasts sharply with the type of pavement used on the new National Airport at Washington which is made as dense as possible. Mr. Bunker also recommended use of a 9-in. crown in a width of 150 ft. This also was questioned in discussion, it being pointed out that ponding occurs on the new Washington airport where the crown is 12 in. in a 200 ft. width. Mr. Tarwater said that he does not believe it possible to build a pavement that will be free of ponding with flatter slopes.

Highway salary studies

A departure from the program was a talk by Allen P. Richmond, assistant secretary of the society, on the work done by the society to help state highway departments put their salary scales on a sound basis. Recommendations made by Mr. Richmond after an extended study of the engineering division of the Arizona highway department were adopted during the year and similar recommendations for Nevada are now before the commission for approval. Inquiries from eight other states are now before the society.

City planning

T. T. McCrosky, director of planning, New York City department of city planning, was the principal speaker at the well attended city planning division. In his paper "Progress Towards the Master Plan of New York City", Mr. McCrosky told of the progress by the department of city planning since it began its work three years ago. He explained that it is assumed that New York City's present population of 7,455,000 will increase somewhat steadily to 8,600,000 and that the latter population is being used in the city's master plan. That the changes of zoning are perhaps the most effective method for gradual carrying out the principles and concepts of the generalized land-use master plan is the belief of Mr. McCrosky.

Student conference

Well over 200 students from student chapters in 22 engineering schools in eastern states attended the student chapter conference held Wednesday afternoon. The meeting was made the occasion of the presentation of the first award of the Mead Prize for students, the award going to Harry A. Balmer of George Washington University for his paper "Professional Ethics." This was followed by talks from two Navy men on opportunities for engineering graduates in the air service of the Navy, by presentation of the Navy's new picture "Eyes of the Navy," and by a talk by John P. Hogan, retiring president, on "National Defense and the Young Engineer." Colonel Hogan expressed the opinion that the defense program, especially the construction of bases in the West Indies, would create many unusual opportunities for young engineering graduates. The meeting closed with the showing of motion pictures of the Tacoma Bridge failure.

WASHINGTON HIGHLIGHTS

PRIMARILY as a result of its new emphasis on defense work the Corps of Engineers has been reshuffling its divisions and districts over the past months, a process now about complete. This defense emphasis—largely in connection with Army air fields—has gone so far that in the face of declining flood control and navigation appropriations the corps now has more work in hand than ever before, of which the larger portion is defense.

The biggest organizational change is the creation of a new division, the Eastern Division, to handle work at new Atlantic Bases. Lt. Col. J. D. Arthur is division engineer for this division, which is divided into four districts: the Newfoundland District under Lt. Col. P. G. Bruton, the Bermuda District under Maj. D. G. White, the Jamaica District under Maj. R. G. Lovett, and the Trinidad District under Maj. D. A. D. Ogden.

A major motive in other changes is to bring Engineer subdivisions into conformity with subdivisions of the Air Corps, with whom the engineers are now working closely. Thus, air fields in the Mobile district come under the jurisdiction of an Air Corps headquarters in Florida. Hence the Mobile Engineers District was shifted to the South Atlantic Division.

This left the Gulf Division too small, so it was abolished. The two New Orleans districts were consolidated and put under the Lower Mississippi Valley Division. The Galveston district was put under the Southwestern Division. This made it desirable to move the Southwestern headquarters from Little Rock to a more central location in Dallas.

For similar reasons, and also to avoid overloading the South Atlantic Division, the Washington, D. C., and Baltimore districts has been shifted from the South to the North Atlantic Division.

The remaining change, consolidation of the Bonneville district with the Portland district, was made simply to reduce overload on the lessening amount of work in that area.

AN ADMINISTRATION measure calling for creation of a Columbia Power Administration has been introduced by Rep. Hill of Washington and is given a fair chance of passage. The Administration would market power from Bonneville and Grand Coulee dams and would also have power of eminent domain to buy out the private utilities in the area. It would be authorized to issue [illegible]0,000,000 of bonds for the purpose. Under the bill, actual operation of the dams would remain in the Corps of Engineers and the Bureau of Reclamation. The proposed administration would report to the Secretary of the Interior.

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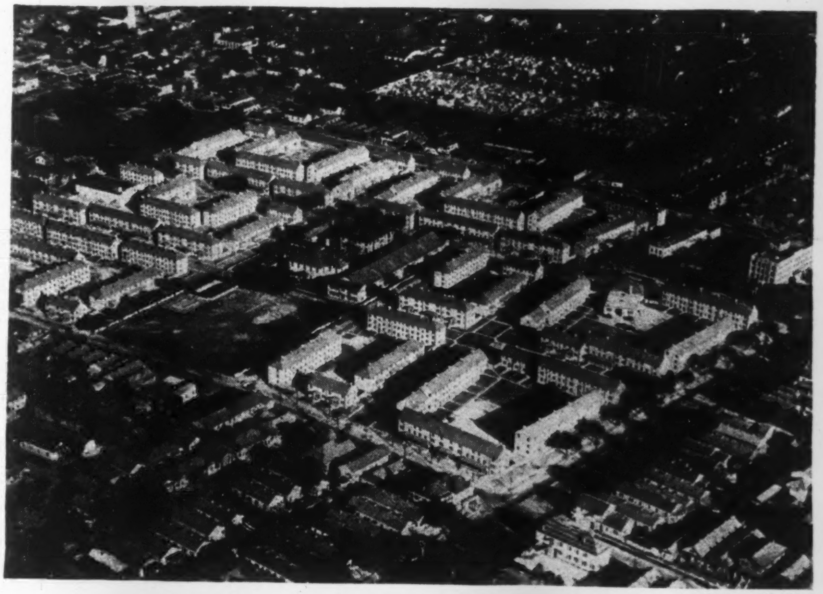

Aerographic Photo

New Orleans begins to rehouse Negro population

Magnolia Housing, a slum clearance project consisting of 723 family units for negroes, was opened for occupancy Jan. 15 at New Orleans, La. This is the first in a group of six similar projects planned to relieve a serious sanitary condition and fire hazard existing among the city's colored population. Demolition of several hundred frame dwellings on the site was started two years ago in the early summer.

Supervision of construction was under the direction of J. F. Brodtmann, chairman of the New Orleans Housing Authority, owners, and construction was carried out, including clearance of site, by R. P. Farnsworth & Co., Inc., general contractors of New Orleans. Cost of the project was $2,500,000.

Tacoma bridge boards meet in New York

Taking advantage of the presence of the members in the East to attend the annual convention of the American Society of Civil Engineers, the two engineering boards investigating the collapse of the Tacoma Narrows suspension bridge held both separate and joint meetings in New York City recently. The board appointed by the Washington Toll Bridge Authority to estimate the extent of the damage to the bridge consists of Russell G. Cone, L. J. Sverdrup and Francis Donaldson. The board appointed by the Federal Works Agency to investigate the cause of the collapse consists of O. H. Ammann, Theodore von Karman and Glenn B. Woodruff. When the boards will report is not known.

In addition to the studies by the two boards that met in New York, a third investigation has also been under way by the insurance companies holding policies on the bridge. Clifford E. Paine and Charles Evan Fowler are the engineers on this latter work.

Sewage Works Federation adopts new constitution

By implementing the Federation of Sewage Works Association with a new constitution, employment of a part-time secretary and receipt of a $5,000 subsidy from the Water and Sewage Works Manufacturers Association, the organization was started on the second era of its existence when the board of control of the federation met in New York on Jan. 15. The board also decided to hold a national convention of the association in New York City on Oct. 9-11. Cessation of support from the Chemical Foundation, which sponsored the federation since its establishment in 1928, was a factor in bringing about the reorganization.

W. H. Wisely, superintendent of the Urbana-Champaign Sanitary District, was appointed executive secretary. Other officials to hold office until the October meeting are: president, C. A. Emerson; vice president, A. S. Bedell; and treasurer, W. W. DeBerard. Named on the executive committee in addition to the president and vice president were William J. Orchard, William Piatt and Charles G. Hyde. F. W. Mohlman will continue as editor of the *Sewage Works Journal*, the bimonthly publication of the association. A $20,000 budget was adopted for the coming year.

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Efforts of the power division to expand its usefulness, inaugurated following a symposium on future work of the division held last January, bore fruit in the form of one of the largest meetings of the division held in recent years. Under discussion were the fundamental aspects of the depreciation problem, a program arranged by a joint committee on depreciation made up of representatives of the power, city planning, construction, engineering economics, highway, sanitary and surveying and mapping divisions.

Gabriel A. D. Preinreich, certified public accountant, New York, opened the discussions with a paper on the theory and general principles of depreciation. He sees no purpose in introducing depreciation accounting into government finances. That view was opposed later by other speakers who held that it should be included in all government operations that are or should be on a self-liquidating basis.

J. A. Walls, president of the Pennsylvania Water and Power Co., took up the subject of depreciation from the angle of the regulated utilities. He noted that there are numerous concepts of depreciation, hence it is important that the concept that is applied must be in line with the objective sought. He does not think determination of depreciation can be reduced to a mathematical formula.

Prof. Eugene L. Grant, Stanford University, also noted the various concepts and the confusion that results therefrom. He expressed the hope that the joint committee on depreciation will be able to eliminate some of the confusion that now exists.

H. J. Flagg, chief engineer, New Jersey Board of Public Utility Commissioners, supported the opinion expressed by Mr. Walls that depreciation cannot be reduced to a mathematical formula. Great uncertainty, he said, surrounds any attempt to predict the future life of utility equipment. C. B. Benson, New York Public Service Commission, acknowledged the uncertainties that surround attempts to develop mathematical methods but noted that an analysis of life tables of $400,000,000 of utility property compiled by the New York commission, indicates that obsolescence of equipment is very closely related to age, thus making it possible to predict quite closely the remaining useful life of equipment.

Nelson Lee Smith, chairman of the New Hampshire Public Service Commission, expressed similar views, stating that statistical studies of past experience are very helpful in predicting future useful life. Judgment, he said, must be applied to the statistical information, but judgment alone should not be substituted for a statistical approach.

Roy W. Crum, director of the Highway Research Board, and Prof. Robley Winfrey of Iowa State College discussed depreciation as applied to public works, chiefly to highways. They pointed to the need for adequate depreciation accounting in highway finance as an aid to sound advance plannning. Many governmental agencies, however, are kept from setting up proper depreciation accounting by antiquated laws requiring cash accounting.

Prof. Paul T. Norton, Jr., Virginia Polytechnic Institute, pointed to the danger inherent in attempting to apply capital accounting to non-liquidating public works. Such methods can be used to fool the public into unjustifiable expenditures on the false assumption that the expenditure can spread over a long period of years by the application of such accounting.

George E. Goldthwaite expressed the opinion that the present unwillingness of utility companies to face depreciation properly is understandable in view of the past history of utility regulation, but he believes that their failure now is working to their disadvantage. Anything that postpones amortization, he said, invites financial suicide.

St. Lawrence power opposed

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in. crown in a width of 150 ft. This also was questioned in discussion, it being pointed out that ponding occurs on the new Washington airport where the crown is 12 in. in a 200 ft. width. Mr. Tarwater said that he does not believe it possible to build a pavement that will be free of ponding with flatter slopes.

Highway salary studies

A departure from the program was a talk by Allen P. Richmond, assistant secretary of the society, on the work done by the society to help state highway departments put their salary scales on a sound basis. Recommendations made by Mr. Richmond after an extended study of the engineering division of the Arizona highway department were adopted during the year and similar recommendations for Nevada are now before the commission for approval. Inquiries from eight other states are now before the society.

City planning

T. T. McCrosky, director of planning, New York City department of city planning, was the principal speaker at the well attended city planning division. In his paper "Progress Towards the Master Plan of New York City". Mr. McCrosky told of the progress by the department of city planning since it began its work three years ago. He explained that it is assumed that New York City's present population of 7,455,000 will increase somewhat steadily to 8,600,000 and that the latter population is being used in the city's master plan. That the changes of zoning are perhaps the most effective method for gradual carry- [illegible] the principles and concepts of

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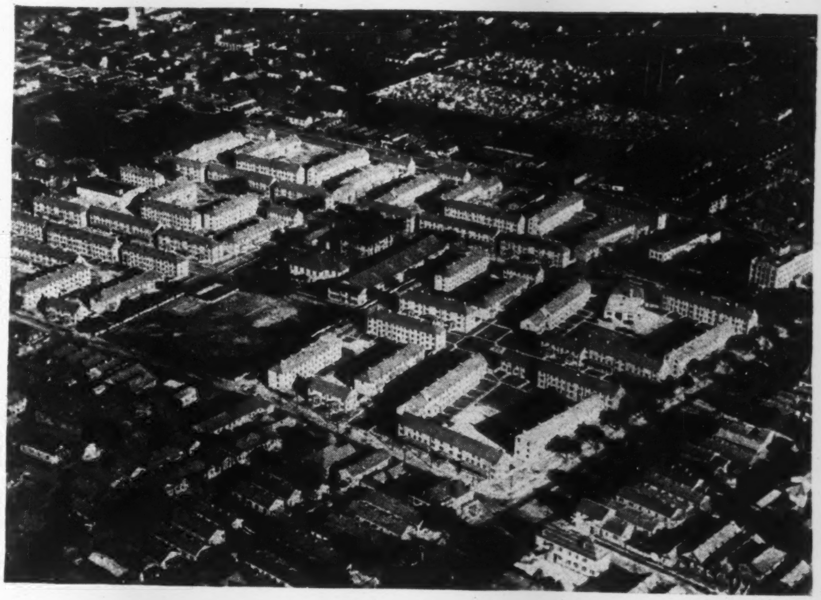
WASHINGTON HIGHLIGHTS

PRIMARILY as a result of its new emphasis on defense work the Corps of Engineers has been reshuffling its divisions and districts over the past months, a process now about complete. This defense emphasis—largely in connection with Army air fields—has gone so far that in the face of declining flood control and navigation appropriations the corps now has more work in hand than ever before, of which the larger portion is defense.

The biggest organizational change is the creation of a new division, the Eastern Division, to handle work at new Atlantic Bases. Lt. Col. J. D. Arthur is division engineer for this division, which is divided into four districts: the Newfoundland District under Lt. Col. P. G. Bruton, the Bermuda District under Maj. D. G. White, the Jamaica District under Maj. R. G. Lovett, and the Trinidad District under Maj. D. A. D. Ogden.

A major motive in other changes is to bring Engineer subdivisions into conformity with subdivisions of the Air Corps, with whom the engineers are now working closely. Thus, air fields in the Mobile district come under the jurisdiction of an Air Corps headquarters in Florida. Hence the Mobile Engineers District was shifted to the South Atlantic Division.

This left the Gulf Division too small, so it was abolished. The two New Orleans districts were consolidated and put



Aerographic Photo

New Orleans begins to rehouse Negro population

Magnolia Housing, a slum clearance project consisting of 723 family units for negroes, was opened for occupancy Jan. 15 at New Orleans, La. This is the first in a group of six similar projects planned to relieve a serious sanitary condition and fire hazard existing among the city's colored population. Demolition of several hundred frame dwellings on the site was started two years ago in the early summer.

Supervision of construction was under the direction of J. F. Brodtmann, chairman of the New Orleans Housing Authority, owners, and construction was carried out, including clearance of site, by R. P. Farnsworth & Co., Inc., general contractors of New Orleans. Cost of the project was $2,500,000.

Under the bill, actual operation of the dams would remain in the Corps of Engineers and the Bureau of Reclamation. The proposed administration would report to the Secretary of the Interior.

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Sewage Works Federation adopts new constitution

By implementing the Federation of Sewage Works Association with a new constitution, employment of a part-time secretary and receipt of a $5,000 subsidy from the Water and Sewage Works Manufacturers Association, the organization was started on the second era of its existence when the board of control of the federation met in New York on Jan. 15. The board also decided to hold a national convention of the association in New York City on Oct. 9-11. Cessation of support from the Chemical Foundation, which sponsored the federation since its establishment in 1928, was a factor in bringing about the reorganization.

W. H. Wisely, superintendent of the Urbana-Champaign Sanitary District, was appointed executive secretary. Other officials to hold office until the October meeting are: president, C. A. Emerson; vice president, A. S. Bedell; and treasurer, W. W. DeBerard. Named on the executive committee in addition to the president and vice president were William J. Orchard, William Piatt and Charles G. Hyde. F. W. Mohlman will continue as editor of the *Sewage Works Journal*, the bimonthly publication of the association. A $20,000 budget was adopted for the coming year.

To guard Indiana's stake in Charlestown boom

Henry B. Steeg, senior member of Henry B. Steeg & Associates, consulting engineers, of Indianapolis, Ind., has been appointed by Governor Townsend of that state as coordinator of all state and federal activities, including technical, financial, taxing, housing and sanitation phases in the district covering Charlestown, Union Center, Burns City and Jefferson County.

Mr. Steeg's work will be devoted to eliminating many of the problems that have arisen in connection with the extensive national defense construction in this area. He will have field offices at Charlestown, Laporte, Burns City and Madison and a central office at Indianapolis. Mr. Steeg, former city engineer of Indianapolis, is a graduate of Purdue University with the class of 1924. He has taken a leave of absence from his consulting engineering firm to serve on this assignment.

Tacoma Bridge studies to be continued

Prof. F. B. Farquharson, who was on the Tacoma Narrows suspension bridge when its center span collapsed, Nov. 7, has been granted a leave of absence by the University of Washington to continue his studies of the failure by models and in the field. Recent activities have involved investigations of air currents, and photographic studies of the bridge as workmen remove the twisted wreckage.

Additional work will be done with two scale models of the bridge which are being constructed in the university's engineering laboratories at Seattle for use in wind tunnel tests. This investigation will supplement the mechanical model studies upon which Prof. Farquharson was engaged at the time of the collapse.

Prof. Farquharson is being assisted in his research by Prof. Frederick C. Smith of the civil engineering school, and two senior engineering students, Norman Dahl and Lorimer Robertson.

JOBS OF THE WEEK

SHIPWAYS, Portland, Ore.
U. S. Maritime Commission, Washington, D. C. has awarded contract for constructing four shipways to Portland Shipbuilding Co., Portland, Ore., at an estimated cost $4,700,000. Charles A. Shea of J. F. Shea Inc., is president of company.

AIRBASE, Everett, Wash.
General Construction Co., Seattle, Wash., has received contract for constructing buildings, magazines, control tower, night lighting, paving, fencing, drainage and sewage disposal, for the Army Air Base, to be erected for U. S. Engineers, Seattle. Cost of the project is estimated at $1,280,000.

MANUFACTURING BUILDING, Plymouth, Mich.
W. E. Wood Co., Detroit, Mich., has been awarded contract to construct a 1 story, 280x840-ft. steel and concrete manufacturing building and a boiler house for Kelsey Hayes Wheel Co., Plymouth, Mich. Estimated cost $1,000,000.

SHIPWAYS, Houston, Tex.
Houston Shipbuilding Co., has received contract from U. S. Maritime Commission, for constructing 5 or 6 shipways at Houston, Texas. Estimated cost is $1,500,000.

CAN MAKING PLANT, St. Louis, Mo.
The Austin Company, Cleveland, O., has been awarded contract for construction of a one story, 440x460-ft. factory; two-story office and a 300x400-ft. warehouse, for Continental Can Co., of New York, N. Y., to be erected at St. Louis, Mo. Estimated cost $1,500,000, including equipment.

AIRPLANE FACTORY, Columbus, O.
Skilken Bros., Columbus, O., were low bidders for constructing an airplane factory, at Port Columbus Airport, for Curtiss-Wright Corp., Buffalo, N. Y., at $1,092,000. Steel contract awarded to American Bridge Co., Pittsburgh, Pa. Total estimated cost of project is $10,000,000.

BAG LOADING PLANT, Charlestown, Ind.
Winston Brothers, Minneapolis, Minn., has been awarded contract for constructing a bag manufacturing and loading plant, adjacent to E. I. duPont de Nemours Co., powder plant, for War Department. Estimated cost is $3,000,000. Plant will be operated by Goodyear Tire & Rubber Co., Akron, O. Total estimated cost of project $18,000,000.

CHEMICAL PLANT, Monsanto, Ill.
Monsanto Chemical Co., Monsanto, Ill., has received contract to construct a plant for the manufacture of gas warfare defense chemicals from War Department, at a cost of $2,352,000.

BAG LOADING PLANT, Pulaski, Va.
Mason & Hanger Co., Inc., New York, N. Y. has contract for constructing a bag loading plant for War Department. Cost estimated at $9,376,390, and will be operated by Hercules Powder Co., Wilmington, Del. This project is in connection with smokeless powder plant at Radford, Va. (*ENR—Jan. 2. Jobs of the Week*)

AIRPORT, Charlotte, N. C.
Goode Construction Corp. of Charlotte, N. C., has received contract for constructing an airport for War Department. Cost estimated at $1,187,127.

CHEMICAL PLANT, Niagara Falls, N. Y.
E. I. duPont de Nemours & Co., Wilmington, Del., has been awarded contract by War Department, to construct and operate plant addition for manufacture of gas mask charcoal and other chemicals at Niagara Falls, N. Y. Estimated cost $5,000,000.

SMALL ARMS PLANT, Denver, Colo.
Broderick & Gordon, Colorado Springs, Colo., has contract for construction of a small arms and ammunition Plant for War Department. Estimated cost $10,000,000. Remington Arms Co., Bridgeport, Conn., will equip and operate the plant.

CANTONMENT, Leesville, La.
W. Horace Williams Co., Inc., New Orleans, La. has been awarded contract for constructing cantonment at Camp Polk, near Leesville, La., by War Department. Cost is $7,294,227.

SMOKELESS POWDER PLANT, Childersburg, Ala.
War Department has awarded contract for construction and operation of a smokeless powder and bag loading plant to E. I. duPont de Nemours & Co., Wilmington, Del. Estimated cost $35,000,000.

SHIPYARD, San Pedro, Calif.
California Shipbuilding Co. (c/o Bechtel-McCone-Parsons Corp., Los Angeles, Calif.) has received contract for constructing eight shipways in the West Basin of Los Angeles Harbor, to be used in constructing freighters. Contract awarded by U. S. Maritime Commission, at a cost of $4,766,000.

NOTE—Additional bidding and contract news on over 800 projects large and small appear in Construction News section beginning on page 14.

OBITUARY

Chester W. Vanderbilt, sales engineer for the Bethlehem Steel Co., died at East Orange, N. J., Jan. 17. Mr. Vanderbilt was 45, and was a civil engineering graduate from Swarthmore College in the class of 1916.

Leslie C. Whittemore, sewage treatment plant designer for the Sanitary District of Chicago, died Jan. 14. He was 55, and a graduate of Massachusetts Institute of Technology.

George A. Whitehead, president of Whitehead-Comley, Inc., and the Maris Bros. Crane Co. of Philadelphia, died Jan. 9. He graduated from the University of Georgia in the class of 1888 with a BE degree. For many years Mr. Whitehead practiced civil engineering and held many responsible positions with various railroads throughout the southern states. He was 72.

Henry Goldmark, civil engineer, died at Nyack, N. Y., Jan. 15. Mr. Goldmark designed and supervised the construction of the lock gates for the Panama Canal as a member of the staff of Gen. George W. Goethals from 1906 to 1914. From 1914 to 1917 he was engaged to design lock gates and electrical equipment for the Inland Navigation Canal at New Orleans and later supervised the construction of harbor work at Chemulpo, Korea, for the Japanese government. Mr. Goldmark was educated at the Collegiate and Polytechnic Institute, Brooklyn, N. Y., and received his bachelor of arts degree from Harvard College in 1878, and studied at the Royal Polytechnic School in Hanover, Germany.

Eric Belcher, civil and construction engineer, died at Vancouver, Jan. 10. Mr. Belcher was construction engineer on the Canadian National Ry. through Manitoba and Saskatchewan. He served overseas during the World War as a major with the First Field Unit, Royal Engineers, and later with the Canadian Railway Troops. Mr. Belcher was responsible for the design of track laying machines used by the Allies during the World War.

James J. O'Conner, 33, of the U. S. Engineers, died Jan. 8. Mr. O'Conner was engaged in work on the Blue Mountain Dam project near Bonneville, Ark. He was a native of Butte, Mont.

Roland B. Williams, civil engineer of Mt. Vernon, N. Y., died Jan. 13. Mr. Williams was for 35 years engineer with the New York City Board of Water Supply. He was overseas with the AEF attached to the 23rd Engineers.

John Cantley, structural engineer of Philadelphia, died Jan. 11. Mr. Cantley had been employed by the Bureau of Building Inspection of the city of Philadelphia for 28 years. He was 66.

Carl Henry Hoge, engineer for the Puget Sound Power & Light Co. at Seattle, Wash., died Jan. 13. Mr. Hoge had been with the Puget Sound Power & Light Co. since 1909, holding position as assistant superintendent of construction, superintendent of the southwest division and assistant engineer. At the time of his death he was in charge of transmission and distribution for the company. He was a graduate of the University of Illinois in the class of 1909.

States asked to aid military traffic

In an effort to facilitate the movement of military traffic with the least interference possible with normal civilian traffic on the highways, the governor of each of the 48 states has been asked by the War Department to name a committee to advise and aid in the preparation of plans for Army troop movements.

The state committees will support and cooperate with the work of the Highway Traffic Advisory Committee, Dec. 9, 1940, to give advice on military traffic movements. One member of each state committee will act as a liaison officer between the states and the army.

CONTRACTS AND CAPITAL

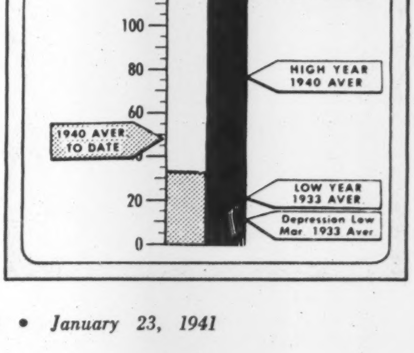
Engineering construction awards for the week, $156,174,000, top the corresponding 1940 week by 378 percent, almost five times the last year's total, and are 75 percent higher than last week.

Public construction gains 424 percent over a year ago, and 144 percent over last week as a result of the increased volume of federal awards which are the highest since mid-October in 1940. Private awards are 262 percent above the 1940 week, but are 15 percent lower than last week.

The week's construction total brings 1941 awards to $485,715,000, an increase of 153 percent over the four-week period last year. Private work is up 140 percent; and public construction is 159 percent higher due to the 1,038 percent gain in federal awards.

Over three-quarters of the week's total, $118,412,000, is in building awards, industrial, commercial and public, all of which top their last year's totals by wide margins. In addition to these classes of work, sewerage, bridges, streets and roads, and unclassified report increases over a year ago. Comparisons with last week show gains in waterworks, sewerage, industrial and public buildings, streets and roads, and unclassified construction.

New capital for construction purposes for the week, $31,920,000, is 541 percent higher than last year. The week's volume of financing is made up of $19,316,000 in corporate security issues, and $12,604,000 in state and municipal bond sales.



ENR-CONSTRUCTION VOLUME

CONTRACTS

(Thousands of dollars)

	Week Ending Jan. 25 1940	Week Ending Jan. 16 1941	Week Ending Jan. 23 1941
Federal	$5,385	$26,515	$102,409
State & Municipal	18,151	23,878	20,645
Total public	$23,536	$50,393	$123,054
Total private	9,142	38,781	33,120
TOTALS	$32,678	$89,174	$156,174
Cumulative			
1941 (4 weeks)			$485,715
1940 (4 weeks)			$191,977

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1940 4 weeks	Cumulative 1941 4 weeks
NON-FEDERAL	$73,908	$82,139
Corp. Securities	10,318	25,054
State & Mun.	18,333	43,422
U.S.H.A. loans	45,199	12,043
R.F.C. loans	58	1,620
FEDERAL	......	......
TOTAL CAPITAL	$73,908	$82,139

FHA MORTGAGES

	Week Ending Jan. 20 1940	Week Ending Jan. 11 1941	Week Ending Jan. 18 1941
Selected for appraisal	$15,240	$17,767	$19,766*
Cumulative			
1941 (3 weeks)			$50,530*
1940 (3 weeks)			$44,637

* Subject to revision.

ENR INDEX NUMBERS

Index Base=100		1913	1926
Construction Cost	Jan. '41	249.69	120.03
Building Cost	Jan. '41	207.94	112.46
Volume	Dec. '40	344	151

CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

FLOOD PROTECTION, NEW YORK

OWNER: U. S. Engineer Office, Binghamton, N. Y.

PROJECT: Construction of flood protection project (Section 3) along right bank of Susquehanna River in the city of Binghamton, Broome County, N. Y. Work consists of driving sheet piling; raising and facing an existing concrete wall; construction of new concrete flood wall; earth fill access ramp; all excavation and backfill; placing dumped riprap; drainage system along new wall; and removing existing concrete groins.

CONDITIONS: Contractor to furnish all material except cement, aggregates, and 893 lineal ft. of steel sheet piling which will be furnished by owner. To be completed in 250 calendar days. Highway and railway facilities for transportation of materials. Minimum wages prevailing are: skilled labor, $1.00 to $1.40 per hr.; semi-skilled, 70 to 85c.; and common, 62½c.

BIDS: Seven bids were opened December 10, 1940, ranging from the contract low of $93,971 to $218,670.

LIST OF BIDDERS:

1. L. B. Strandberg & Son, Chicago, Ill. (contract)	$93,171
2. Street Bros. Constr. Co., Syracuse, N. Y.	95,231
3. C. D. Murray Co., Inc., Syracuse, N. Y.	121,545
4. Binghamton Constr. Co., Inc., Binghamton, N. Y.	122,240
5. Howes & Farrell, Inc., Oneida, N. Y.	138,492
6. Clevorock, Inc., New York, N. Y.	190,154
7. Spencer & Ross, Inc., Detroit, Mich.	218,670

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Common excavation	5,500 c. y.	$1.00	$0.70	$0.50
2. Borrow excavation	6,000 c. y.	.60	.40	.50
3. Sheeting (incl. shoring)	2,500 s. f.	.60	.20	.50
4. Remove conc. and masonry	100 c. y.	6.00	6.00	10.00
5. Compacted earth fill	4,900 c. y.	.70	.30	.80
6. Riprap	1,500 ton	5.00	5.00	8.00
7. Monolithic concrete	920 c. y.	27.40	21.00	35.00
8. All other concrete	1,270 c. y.	13.70	17.00	20.00
9. Test and seale exist. conc. surf	13,900 s. f.	.05	.20	.10
10. Conc. reinforcing steel	185,000 lb.	.046	.06	.06
11. Drill holes, conc. or masonry	2,545 l. f.	.60	1.00	.50
12. Furn., drive stl. sheet piling, type I.	10,700 s. f.	1.00	1.10	1.50
13. As above, type II	2,900 s. f.	1.20	1.35	1.60
14. Drive or pull exist. stl. sheet piling	650 s. f.	1.00	.50	1.00
15. Drive stl. sheet piling (furn. by gov't)	893 s. f.	.70	.50	1.00
16. Cut steel sheet piling	100 l. f.	.60	1.00	2.00
17. Structural steel	6,000 lb.	.07	.10	.10
18. Brick in manholes	2.1 M	70.00	75.00	50.00
19. 8-in. corr. metal pipe	183 l. f.	1.80	2.50	2.00
20. 10-in. corr. metal pipe	190 l. f.	2.00	2.75	2.00
21. 12-in. corr. metal pipe	153 l. f.	2.20	3.00	2.50
22. 24-in. corr. metal pipe	11 l. f.	5.00	7.50	6.00
23. Gravel for drains	140 c. y.	2.10	3.00	3.00
24. Recondition, relay pipe	200 l. f.	.50	1.50	1.00
25. 24-in. automatic drainage gate	1 ea.	90.00	100.00	100.00
26. Misc. metal work	2,000 lb.	.15	.15	.20
27. Cast iron pipe, 12-in. and under	1,000 lb.	.12	.10	.20
28. Vit. tile pipe, 12-in. and under	100 l. f.	1.00	2.00	2.00
29. 4-in. horiz. swing check valves	1 ea.	35.00	25.00	30.00
30. 6-in. horiz. swing check valves	1 ea.	50.00	35.00	50.00
31. 8-in. horiz. swing check valves	1 ea.	60.00	60.00	80.00
32. 10-in. horiz. swing check valves	1 ea.	70.00	85.00	100.00
33. 12-in. horiz. swing check valves	1 ea.	100.00	125.00	150.00

BRIDGE AND APPROACHES NEW MEXICO

OWNER: New Mexico State Highway Dept., Santa Fe.

PROJECT: Construction of a fourteen 60-ft. span concrete and steel bridge and approaches located in Rio Arriba County on U. S. Highway No. 285, at Espanola, N. M. Approximate length is 0.369 miles.

CONDITIONS: Contractor to furnish all material and complete work in 225 weather working days. Highway transportation facilities available. Wages stipulated as minimum are: skilled, 80c. to $1.50 per hr.; semi-skilled, 60c.; common, 40c.

BIDS: Six bids were opened October 29, 1940, ranging from the contract low of $188,733 to $255,106.

LIST OF BIDDERS:

1. Sanders Brothers, Santa Fe, N. M. (contract)	$188,733
2. A. O. Peabody, Santa Fe, N. M.	213,937
3. Henry Thygesen & Co., Inc., Albuquerque, N. M.	217,012
4. Sharp & Fellows Constr. Co., Los Angeles, Cal.	221,632
5. L. R. Allison, Albuquerque, N. M.	233,385
6. W. E. Bondurant, Roswell, N. M.	255,106

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Remove old drainage structures	L. S.	$3,000.00	$1,000.00	$4,000.00
2. Unclassified excavation	17,388 c. y.	.20	.15	.20
3. Excavation for structures	690 c. y.	1.00	1.00	1.50
4. Overhaul	40,956 sta. y.	.01	.01	.01
5. Haul	26,367 y. mi.	.04	.05	.03
6. Two crse. surfacing, bottom crse	317 c. y.	1.75	1.00	.80
7. Two crse. surfacing, top crse	360 c. y.	2.00	1.00	1.00
8. Portland cem. conc. pavement	3,615 s. y.	2.50	2.50	2.60
9. Fabric reinforcement	11,061 lb.	.065	.08	.10
10. Deformed metal, long. center joint	660 l. f.	.15	.20	.20
11. Cl. A conc., curb and gutter	119 c. y.	17.00	20.00	18.00
12. Cl. A conc., drainage struct	120 c. y.	16.00	18.00	20.00
13. Reinforcing steel	471,508 lb.	.04	.04	.046
14. Struct. steel	966,089 lb.	.055	.07	.054
15. 24-in. std. rein. conc. culv. pipe	419 l. f.	3.00	3.00	3.00
16. 8-in. corr. galv. met. culv. pipe	44 l. f.	1.50	1.25	1.25
17. Project markers	2 ea.	20.00	25.00	25.00
18. Rt.-of-way and station markers	15 ea.	3.00	3.00	3.50
19. Watering	108 M gal.	2.00	1.00	.50
20. Rolling	91 hr.	4.00	3.00	3.00
21. Embankment protectors	2 ea.	20.00	15.00	15.00
22. Remove exist. conc. pavmt	745 s. y.	.30	.25	.30
23. 6-in. concrete sidewalk	6,289 s. f.	.30	.25	.30
24. Excavation, bridge structure	7,570 c. y.	4.00	5.00	5.65
25. Cl. A conc.; superstructure	923.92 c. y.	16.00	20.00	21.00
26. Cl. A conc.; abutment paving	43.54 c. y.	16.00	16.00	18.00
27. Cl. A conc.; substructure	2,070.17 c. y.	15.00	15.00	18.50
28. Waterproofing concrete	2,455 s. y.	.60	.50	.50
29. Light — riprap	580 c. y.	1.50	1.50	1.50
30. Wire fabric, bank protection	34,550 s. f.	.04	.04	.02
31. Galv. pipe, bank protection	2,195 l. f.	.40	.25	.35
32. Excavation, bank protection	880 c. y.	.75	.75	.80
33. Steel handrail	1,574 l. f.	3.00	3.50	2.80
34. Ornamental light std. assem	10 ea.	72.00	50.00	75.00
35. Transformer	1 ea.	415.00	400.00	450.00
36. Controller	1 ea.	110.00	100.00	100.00
37. Time clock	1 ea.	30.00	30.00	35.00
38. Lightning arrester	2 ea.	7.40	8.00	9.00
39. Primary cut-out	2 ea.	7.20	8.00	10.00
40. Service entrance fitting	1 ea.	1.00	2.00	2.00
41. Junction box	3 ea.	4.20	6.00	7.00
42. Single conductor cable	2,560 l. f.	.17	.20	.20
43. Braid covered conductor	250 l. f.	.10	.12	.15
44. Galvanized electric conduit	1,280 l. f.	.25	.25	.30

CHANNEL WIDENING, WASHINGTON

OWNER: Bureau of Reclamation, Columbia Basin Project, Washington.

PROJECT: Widening of Columbia River Channel and riprapping banks near Northport, Wash.

CONDITIONS: Rail and highway transportation facilities available. Contractor to furnish all materials and complete all work in 210 calendar days; channel excavation must be completed within 115 days. Wage rates specified are: skilled labor, $1.65 per hr.; semi-skilled, $1.37½; and common, 75c.

BIDS: Six bids were received November 13, 1940, ranging from the contract low of $249,000 to $381,000.

LIST OF BIDDERS:

1. Max J. Kuney Co., Spokane, Wash. (contract)	$249,000
2. G. D. Lyon & Co., Spokane, Wash.	271,500
3. Barnard-Curtiss Co., Minneapolis, Minn.	272,100
4. Strong & Macdonald Inc., Tacoma, Wash., and White's Trucking Co., Walla Walla, Wash.	292,560
5. J. A. Terteling & Sons, Boise, Idaho	360,000
6. L. Romano Engr. Co., Seattle, Wash.	381,000

Item	Quan.	Unit Prices		
		(1)	(2)	(3)
1. Excavation for river channel	300,000 c. y.	$0.80	$0.815	$0.8
2. Riprap	18,000 c. y.	[illegible]	1.50	[illegible]